



GOVERNMENT OF MAHARASHTRA
WORKING PLAN
FOR
THE FORESTS OF GADCHIROLI FOREST DIVISION
NORTH CHANDRAPUR CIRCLE
FOR THE YEAR
2007 - 2008 TO 2016 - 2017.

VOLUME-I

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GOVERNMENT OF INDIA
पर्यावरण एवं वन मंत्रालय

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DE-06-12-2007

No. : 12-22/2006 (FOR)/ 4451,

To,

The Principal Secretary,
Revenue and Forest Department,
Mantralaya,
MUMBAI

Sub: Working Plan proposal for Gadchiroli Forest Division, written by Shri K. Narasimhulu and Shri K. Ravichandran for the period of 2007-08 to 2016-17.

Ref: 1. Revenue and Forests Deptt., Government of Maharashtra letter No. FDM 2007/C.R. 177/F-2, dated 13 July, 2007.
2. PCCF, Govt. of Maharashtra letter No. D-14/WP/CR/799/07-08, dated 14.11.2007.

Sir,

With reference to the above mentioned subject, I am to say that after careful examination of the Working Plan of Gadchiroli Forest Division, the Central Government hereby conveys its approval to the said working plan in accordance with the powers vested under Forest (Conservation) Act, 1980 subject to following conditions:-

- (1) The currency of the Working Plan shall be for a period of 10 years i.e. from 2007-08 to 2016-17.
- (2) The modified definition of "malformed tree" shall be followed in the implementation of "Improvement Working Circle".
- (3) The entire area proposed for "Teak Plantation Working Circle" shall be incorporated in "Selection-cum-Improvement Working Circle".
- (4) The orders of Hon'ble Supreme Court in the matter of Godaverman Therumalkpad Vs Union of India in W.P. (Civil) No. 202/95 and related Inter Locutory applications shall be strictly adhered to. Any prescription or operation at variance with the Hon'ble Supreme Court's order shall be kept in abeyance till the order is in force or otherwise modified.
- (5) Further, in compliance with orders of Hon'ble Supreme Court's dated 22.09.2000, the state government of Maharashtra shall ensure that regeneration of forests is commensurate with fellings carried out under this working plan.
- (6) No felling shall be carried out without allocating necessary fund for implementation of regeneration operation so as to make regeneration commensurate with fellings. In the event of failure in regeneration or any shortfall in carrying out regeneration operation, no further felling shall be undertaken until the failure/shortfall is made up.

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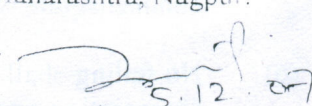
- (7) Following the directions of the Hon'ble Apex Court in their order dated 22.09.2000, a Core Group has been constituted under the Chairmanship of the Director General of Forests and Special Secretary for deciding the extent of harvesting that could be permitted under approved Working Plans for ensuring regeneration to be commensurate with fellings. Instruction/directions of the Central Government in the matter to be issued in future shall be strictly complied with. Felling to be done by State Government only after seeking permission from Core Group constituted by the MOEF, New Delhi.
- (8) No forests bearing naturally grown trees shall be clear felled for any purpose whatsoever.
- (9) Prescriptions of microplans for JFM (if made) should not deviate the broad framework/guidelines of the working plan and shall be in accordance with various orders of Hon'ble Supreme Court.
- (10) Felling carried out on forest land after seeking approval of the Central Government under Forest (Conservation) Act, 1980 will not be treated as deviation. However, proposed felling in the forest division shall be restricted proportionately in the current/following years to compensate this removal.
- (11) No deviations shall be made from the prescriptions of working plan read with the conditions stipulated herein without prior approval by the Central Government under Forest (Conservation) Act, 1980. However, deviations of positive nature i.e. out of turn plantations carried out outside the worked area under any project, schemes and compensatory afforestation may be approved by the competent authority of the State Government.
- (12) The Central Government reserves the right to review, modify, withdraw this approval at any time if any of the conditions of approval are not implemented or relevant modification in the working plan is required so as to keep it in conformity with the orders, circulars and guidelines issued by the Central Government or the Apex Court under Forest (Conservation) Act, 1980 or any other statute and National Forest Policy.

Yours faithfully,

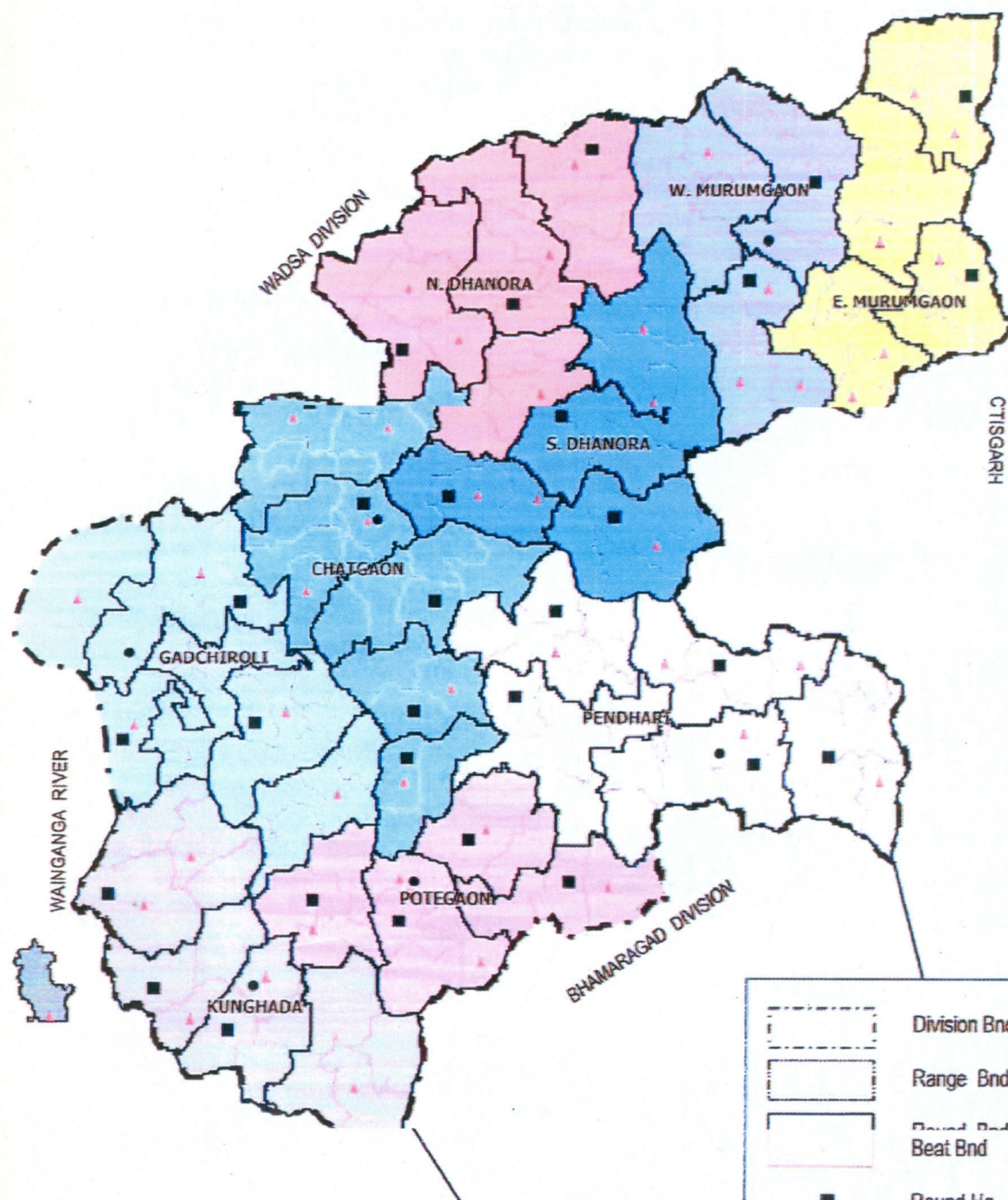
(Dr. B.N. Mohanty)
Chief Conservator of Forests (Central)

Copy to :

1. The Additional Director General of Forests (FC), Ministry of Environment and Forests, Paryavaran Bhawan, CGO Complex, Lodi Road, New Delhi - 110 003.
2. The Principal Chief Conservator of Forests, Govt. of Maharashtra, Seminary Hills, Nagpur.
3. The Chief Conservator of Forests (Working Plan), Government of Maharashtra, Nagpur.


(Dr. B.N. Mohanty)
Chief Conservator of Forests (Central)

ADMINISTRATIVE MAP OF GADCHIROLI FOREST DIVISION



0 25 50 75 100 125 KM



	Division Bnd
	Range Bnd
	Beat Bnd
	Round Hq
	Range Hq
	Beat Hq

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P R E F A C E

The Working Plan of Gadchiroli forest division authored by Shri K. Ravichandran, IFS; Conservator of Forests, Working Plan Division – I, Chandrapur, replaces the Working Plan written by Shri B.P. Singh and Shri Ashok Sharma which expired during 2003-04.

The Preliminary Working Plan Report prepared by Shri Narsinghulu, then Conservator of Forests, Working Plan Division – I, Chandrapur was approved by the State Level Committee in July 2005. Within a period of 1 ½ years, the field work including updation of stock mapping, enumeration, data feeding and analysis and Stem analysis has been completed and the Draft Plan has also been done by the present author. The stock mapping has been updated with the help of territorial staff. The growth data for valuable trees like *Khair* was also collected and the enumeration was extended to important areas beyond S.C.I. Working Circle.

Gadchiroli district is very significant from forestry point of view as about 78% of its land is covered under forest. It is also inhabited largely by tribals. The forests of Gadchiroli are rich in quality and biodiversity, though teak is contained in less than 10% of the forest area of the district. The area has good spread of bamboo and contains valuable NTFP and medicinal plants.

The Plan is the first of its kind as it has been prepared keeping in view the National Forest Policy as well as the National Working Plan Code and the guidelines issued by GOI. The Plan has specific chapters on JFM, Forest Protection, NTFP, Teak Plantation and Eco-tourism.

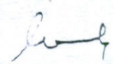
The Plan provides details about protection strategies including JFM specially in view of threats from anti-social elements. The recommendation gives sufficient scope for regeneration and developmental efforts for the forests of these areas and as a result huge employment is likely to be created because of the works proposed. The Plan proposes an annual yield of 32,000 cum of timber, 18,000 fuel beats and about 8 lakhs long bamboo and other NTFP. This is likely to generate Rs.24.50 crores of revenue per year. Apart from it, the ecological benefits likely to be accrued from these forests are predicted to be worth Rs.2700 crores.

Shri Ravichandran and his staff have done a commendable job and the Plan would definitely enrich the forests of Gadchiroli and bring prosperity to the people there, if it is implemented as per schedule and required investment is provided for.

I hereby congratulate Shri K. Ravichandran, IFS, Conservator of Forests, Working Plan Division – I, Chandrapur and his entire team for doing the good work and providing the Plan in the present form.

Place : Nagpur.

Dated: 20th February 2007.


(Ramanuj Choudhary)
Chief Conservator of Forests
(Working Plans), Nagpur.

INTRODUCTION

Gadchiroli Forest Division was carved out from the erstwhile East Chanda Forest Division and came into existence on 28th August, 1983 with its headquarter at Gadchiroli. This Division comprises of 9 territorial Ranges viz. Gadchiroli, Kunghada, Chatgaon, Pendhari, Potegaon, Dhanora North, Dhanora South, Murumgaon East, Murumgaon West. The total forest area of the division is 219411.49 Ha. of which 186917.93 Ha is Reserved Forest and 28170.20 Ha. is Protected Forest. This plan replaces the Working Plan of Shri B.P.Singh & Shri Ashok Sharma for the period 1994-95 to 2003-04.

The preliminary Working Plan report was prepared by Shri K. Narsimhulu, IFS the then Conservator of Forests, Working Plan Division No.1, Chandrapur and was submitted before the State Level Committee for discussion on 26, 27th July, 2005 at Nagpur and suggestions were given for necessary corrections.

The preparation of draft plan was carried out by me on 13.2.2006 when I took charge as Conservator of Forests, Working Plan Division-1. For the revision of this plan the field works of Gadchiroli Division were carried out by SOFR, Units of Amravati and Chandrapur Working Plan Dn-2 under the supervision of Shri T.K.Choubey, the then Dy. Conservator of Forests, Working Plan Division-1, Chandrapur. During 2003-04 part work was completed and the remaining work of tree enumeration was completed by July/06.

The job of preparing stock maps was entrusted to the Dy. Conservator of Forests, Gadchiroli Forest Division, Gadchiroli as per the instruction of Addl. Principal Chief Conservator of Forests (Production & Management) M.S. Nagpur during the year 2003-04 and accordingly the stock maps were prepared.

The working plan of Gadchiroli Forest Division encompasses the ideas of National Forest Policy of 1988 and more emphasis is laid on Conservation, preservation and protection of forests and wildlife.

Gadchiroli Forests contains basically miscellaneous forests with less than 10% of teak scattered with miscellaneous species. The site quality of the tract varies from III to IV. Based on the site quality and composition of crop the forests of this division has been prescribed to be managed under the following Working Circles.

1. Selection-Cum-Improvement Working Circle
2. Improvement Working Circle
3. Afforestation Working Circle
4. Fodder Development Working Circle
5. Teak Plantation Working Circle
6. Tussar Plantation Working Circle
7. Bamboo (Overlapping) Working Circle
8. Wildlife (Overlapping) Working Circle
9. Non Wood Forest Produce (NWFP) (Overlapping) Working Circle
10. Protection (Overlapping) Working Circle
11. Joint Forest Management (Overlapping) Working Circle &
12. Eco-tourism

Forest Protection, Joint Forest Management and Eco-tourism are the mandatory chapters as per the National Working Plan Code-2004.

The forests nearby the human habitations have been severely degraded and natural regeneration is not satisfactory due to heavy biotic pressure and hence these

areas are taken from the S.C.I. Working Circle of previous plan and put in Improvement Working Circle.

To convert the existing un-even aged teak and miscellaneous forests in to high quality even aged teak forests and to observe strict silvicultural operations in the successful old teak plantations, a separate teak plantation working circle has been prescribed.

Similarly to rehabilitate and regenerate the areas around the villages with improved varieties of grasses and to meet the grazing demand, Silvi-pastoral Development Working Circle has been prescribed.

This working plan has also suggested for establishment of Eco-tourism zones on the lines of National Policy on Eco-tourism of Govt. of India in order to educate the people and to create awareness among the citizens visiting forest areas about the conservation, preservation and protection of natural resources including wildlife.

I am extremely grateful to Shri J.N. Saxena, IFS, Shri K. Subramanian, IFS the then Principal Chief Conservator of Forests, Maharashtra State, Nagpur and Shri Jwala Prasad, IFS the present Principal Chief Conservator of Forests, M.S. Nagpur, Shri A.B. Bhangare, IFS, Addl. Chief Conservator of Forests and Shri Ramanuj Choudhary, IFS Chief Conservator of Forests, Working Plan, Nagpur for their kind inspiration and valuable guidance in the preparation and revision of this draft plan.

I am thankful to Shri Shree Bhagwan, IFS the then Conservator of Forests, North Chandrapur Circle, Chandrapur, Shri R.M. Dayal, IFS present Conservator of Forests, North Chandrapur Circle, Chandrapur, Shri Bhalchandra Thakare, IFS Dy. Conservator of Forests, Gadchiroli Forest Division, who had extended their cooperation and valuable help for the preparation of this draft plan.

I am extremely thankful to Shri R.S. Yadav, IFS Conservator of Forests, Working Plan Division-2, Chandrapur and staff of SOFR Unit, Working Plan Division-2, Chandrapur for carrying out and completing the enumeration and analysis datas which contributed to a great extent for completion of this plan.

I am thankful to Shri S.K.Thapliyal, Range Forest Officer, Shri R.T.Khanke, Range Forest Officer, Shri S.V. Deshmukh, Forest Surveyor, Shri P.Y.Mahitkar Forest Surveyor, Shri D.G.Shendre, Forest Surveyor, Shri V.S.Chakinarpuwar, Steno-typist, Working Plan Division No.1 who have done outstanding works in completing this draft working plan and all of them deserve special appreciation for cooperation extended by them.

Place : Chandrapur

Date : 15.2.2007


(K. Ravichandran)
Conservator of Forests
Working Plan Division No.1,
Chandrapur

PART –I

WORKING PLAN OF GADCHIROLI FOREST DIVISION

SUMMARY OF FACTS ON WHICH THE PROPOSALS ARE BASED

SUMMARY OF THE WORKING PLAN FOR GADCHIROLI FOREST DIVISION

FOR THE PERIOD FROM 2007 -2008 TO 2016 –2017
PART-I

SITUATION :

This Working Plan covers Reserved and Protected Forest areas admeasuring 218529.27 Ha. in charge of the Gadchiroli Forest Division which is situated in the middle of Gadchiroli District and within the civil territories of Gadchiroli, Dhanora, part of Chamorshi, Korchi, Kurkheda and Armori Tahsils. The above area is exclusive of 882.22 Ha. Zupdi Jungle. The forest areas are more or less in compact blocks.

CONFIGURATION:

The area is undulating and hilly, the hills being low in height. The forest areas situated on the triangle of high lands forming a table land, which runs the entire length of the western portion of the tract. Numerous hills rise on this table land mainly on the north-eastern, eastern and south-eastern sides of the district. But there is no regular range. Main Blocks of hills are Palasgarh, Gewardha, Satinala and Tipagarh. Wainganga is the main river and Khobragadi, Garvi, Kathani are its tributaries. Other rivers are Tipagharhi and Sati and also there are many seasonal nalas join these tributaries.

GEOLOGY :

The geological formation throughout the division is mainly of Archaean series.

CLIMATE :

The weather remains hot and dry for the major part of the year. The mean maximum temperature is 45.46°C and the mean minimum temperature is about 13.1°C. The highest and lowest temperatures recorded are 46.5°C. in summer and 7°C. during winter. The total average rainfall over the area is 1976 mm.

WATER SUPPLY :

Though the area receives maximum rainfall, water shortage is generally felt during summer season.

BOUNDARIES :

The state of maintenance of boundary lines and pillars is very poor. In case of 'B' class Reserved Forests and Protected Forests, the boundaries do not exist at most of the places, thus leading to encroachment. Even village boundaries of surveyed villages are also not maintained. Unsurveyed villages are still left without proper demarcation. There are 115 unsurveyed villages existing in Gadchiroli Forest Division.

RIGHTS AND CONCESSIONS :

Reserved Forests are not burdened with any kind of rights and concessions; however, some concessions have been granted to small and marginal agriculturists for their bonafied needs. In the Protected Forest areas, which were previously covered in the ex-jamindari forests, nistar rights are recorded in the "Nistar Patrakas" of the concerned village.

DESCRIPTION OF THE FORESTS :

The tract dealt with belong to the group "Tropical Dry Deciduous Forests" and sub-group "5A/C3- Southern Tropical Dry Deciduous Forests."

The local sub-types found are as follows :

A. TEAK FORESTS WITH DENSE BAMBOOS :

- (i) Plain sub-type
- (ii) Hill sub-type

B. TEAK FORESTS WITH SCANTY OR NO BAMBOOS :

- (i) Plain sub-type
- (ii) Hill sub-type

C. MIXED FORESTS WITH SCANTY OR NO BAMBOO :

The forest cover of this division is mainly consist of dry deciduous miscellaneous forests, with only 2.00 % of the area under teak. In teak area the percentage of teak varies from 20 to 30%. The major factors responsible for low percentage of teak are mainly due to edaphic and biotic factors. In mixed miscellaneous forests commonly found major species are *Ain*, *Bija*, *Harra*, *Beheda*, *Semal*, *Haldu*, *Dhaora*, *Bhirra*, *Tendu*, *Salai*, *Mowai*, *Khair*, *Sehna*, *Hirda*, *Behada*, *Aola*, *Char*, *Moha*, *Garadi* etc. Bamboo is found commonly in almost all the ranges of the division except in Kunghada range. The main species of bamboo found is *Dendrocalamus strictus*.

INJURIES TO WHICH THE CROP IS LIABLE :

FIRE:

Fire is one of the important causes of injuries to the forests result in burning of all leaf litter, preventing the formation of humus and thus causing hindrance to the soil building process. The fire also leads to heavy erosion of existing top soil in moderate to gentle slop areas. Fire affects the population of wild flora and fauna and also causing serious damage to the young regeneration. The fire affected saplings and pole crops develop hollowness.

ILLICIT CUTTING :

Illicit cutting is common, especially in the vicinity of human habitations to meet the requirement of small timber and firewood. However, organized illicit felling is not reported.

ENCROACHMENT :

Encroachment and girdling of trees is very common in and around the cultivated areas adjoining to the reserved and protected forests, especially in the areas where the boundaries are not properly demarcated.

GRAZING :

Grazing is another major cause of injury to the existing as well as young crops. The increasing cattle population causes serious biotic pressure leading to fast degradation of forests in and around the human habitation.

DROUGHT:

Drought is common in recent past leading to shortage of drinking water to the human and cattle during the peak summer months.

FROST:

Frost is not common in this area.

WIND:

Strong winds especially during early monsoon causes heavy damage to the mature trees resulting uprooting of trees thus causing huge loss of timber, if not removed and timely disposed off.

LOCAL CUSTOMS AND NEEDS :

The population of the Gadchiroli District as per 2001 census is 7.87 lakh. with a density of 51 per sq.km. The rate of increase in population is

17.26%. As per the cattle census of 1997, the total cattle in the district is 8.80 lakh. The density of the cattle is 57 per sq. km. Agriculturists are mainly dominant in the population but majority of them are small to marginal farmers. Malgujari tanks are the main and potential source of water for irrigation, however due to heavy siltation of tanks such irrigation facility is available only for a limited period. People mainly depend upon forests for timber, firewood, bamboo, grass and other NTFPs such as moha flowers & seeds, myrobalans, gum, honey and broom-grass.

MARKETS :

Forests of this division are mainly worked commercially for timber, firewood, bamboo and certain notified Non-timber Forest Produces. Timber, poles, and firewood are brought to the sale depots, where they are sold in open auction. Fuel beats are sometimes sold at jungle depots itself. Tendu leaves are sold by state wide auction through sealed tenders. Other Non-timber Forest Produces are collected by Maharashtra State Co-operative Tribal Development Corporation through its local collection centers run by the sub agents namely the Adivasi Vividh Karyakari Sahkari Sanstha. Gadchiroli is well connected by a good network of all weather roads connecting the neighbouring districts such as Chandrapur, Gondia, Bhandara and Rajnandgaon of Chattisgarh State and thus providing good market facility.

METHODS OF HARVESTING AND TRANSPORT :

The annual coupes are mainly worked by FLCS and to some extent through department. Felling and logging of forest produce is mostly done by saw and improved implements. Timber and bamboo are transported to main sale depots situated at range/division headquarters and the firewood is transported to local sale depots as per the convenience. The major transportation work is carried out through private transporters by tender system. Departmental trucks and tractors are also used for transportation of timber and fire wood.

STAFF AND LABOUR :

Supervision of all the forestry works is done by the Dy. Conservator of Forests through A.C.F's & R.F.O's. There are 4 A.C.Fs, 14 R.F.Os, 57 Foresters, 181 Forest Guards, 5 Drivers, 1 Cleaner and 1 Surveyor, to cover the field works of the division. The ministerial staff consists of 1 Chief Accountant, 10 Accountants, 20 Clerks, 1 Daftari, 3 Watchman, 4 Peons, 1 Dak-runner in addition there are about 125 forest labourers in the division.

The major population of the area depends on agriculture and most of them are small and marginal farmers. After completion of their rain-fed kharif crops they are mainly dependant on forestry works. The labour potential of the division is high and F.L.C.S. has well trained labourers who do felling and logging operations. In addition to the local labourer, large number of labourers are also migrating from adjoining Chattisgarh, Madhya Pradesh and Andrapradesh states, during the bamboo harvesting and tendu season. However during the rainy season availability of labourer becomes difficult for carrying out plantation works because of agricultural operations.

PAST HISTORY

A. RESERVED FORESTS :

The old reserved forest accounts for 7.85% where as the new reserved forests account for 77.66% of the total area of the division. The old reserved forests were constituted in 1879 under IFA, 1878. These are distributed in all 9 ranges of Gadchiroli Forest Division. Prior to reorganization, Gadchiroli, Chatgaon, Murumgaon, Dhanora ranges were the part of erstwhile East Chanda Division. After re-organization in the year 1983, the Gadchiroli Forest Division was carved out from the East Chanda Division with its headquarter at Gadchiroli. In the newly formed Gadchiroli Division, Gadchiroli, Chatgaon, Dhanora, Murumgaon were initially the main ranges till further re-organization took place. During the period of further reorganization Gadchiroli was divided in to two ranges namely Gadchiroli and Kundhada and Chatgaon was divided into Chatgaon and Pendhari. Hence the Gadchiroli Division was having 6 ranges namely Gadchiroli, Kunghada, Chatgaon, Pendhari. Dhanora and Murumgaon. Again as per GR FDM-2003/File No. 168/F-2, Mantralaya, Mumbai-400 032, dated 10th November, 2005- Gadchiroli Division was further reorganized into 9 territorial ranges, 36 rounds and 150 beats.

Prior to reservation of this forest in 1879, the tract was very much under developed state. There was no proper regulation or control over felling in this forests. After reservation of this forests, some protection measures were undertaken. The regular management of forests started from 1899 under different working plans, which are briefly discussed in subsequent paras.

The reserved forest areas of the tract being dealt with originally belonged to the Wairagarh Range of Chanda Forest Division. First Working Plan for this range, which covered Reserved Forests of Wadsa, Kurkheda, Armori, Chatgaon and Gadchiroli Ranges, was prepared between 1897 to 1900 by A.F.Lawrie.

This plan was quite simple and prescribed only Improvement Fellings. Valuable trees were felled and valueless trees were not felled. The working was not as per the silvicultural requirements.

In 1910 the improvement fellings were replaced by Coppice with standards, but the felling of inferior trees was not enforced except in coupes where the demand was keen.

WORKING PLAN OF VAHID (1927-1935):

This was the first plan prepared after carrying out detailed inspection of the forest. In this plan there were four working circles namely (1) High Forest Working Circle, (2) Coppice with Standard Working Circle (3) Low Forest Working Circle, (4) Low Forest Unworked Working Circle.

The best quality forests were placed under High Forest Working Circle. Under this working circle, conversion to uniform system was prescribed with rotation period of 60 years.

Medium quality forests were worked under Coppice with Standard Working Circle with rotation of 30 years. *Teak* and *Bija* are prescribed as most suitable standards.

Teak and Mixed Forest considered unfit for producing large size timber were allotted to Low Forest Working Circle with rotation of 30 to 40 years.

Remaining poor areas and forests were allotted to the Low Forest Unworked Working Circle in which no regular working was prescribed.

There was no Bamboo Working Circle during this plan period. The Silvicultural System prescribed was clear felling. Thinning works were not carried out because there was no sufficient demand for poles and small timbers.

HEWETSON'S WORKING PLAN (1936-1946):

This Plan replaced the working plan of Vahid. This working plan prescribes the following working circles viz. (1) Coppice with Standard Working Circle (2) Misc. Working Circle (3) Bamboo Working Circle (Overlapping).

COPPICE WITH STANDARD WORKING CIRCLE:

Hewetson brought all the forests allotted to High Forest and Low Forest Working Circles under coppice with standard working circle. The object was to meet the local demand for small timber and fuel. Rotation of coppice was fixed for 40 years whereas no rotation was fixed for standards, due to non-availability of growth statistics for different species.

MISC. WORKING CIRCLE:

This Working Circle mainly comprises of the areas having inferior and open forests and those areas which are far away from the markets.

BAMBOO WORKING CIRCLE (OVERLAPPING):

The areas which were not considered for bamboo working circle during Vahid's plan were brought under this Working Circle. The felling cycle of 3 years was prescribed.

SINGH & MAJUMDAR'S PLAN 1949-64:

This Plan replaced the working plan of Hewetson. Under this plan forest areas were mainly divided into Teak & Miscellaneous forests depending upon the proportionate percentage of teak in the forest cover. The forest having teak with 15% & above were classified as teak forest and the remaining areas were brought under miscellaneous forests. The forests were classified for the first time on the functional basis into tree forests, minor forests, pasture forests and

miscellaneous forests. Based on the above classifications the following working circles were formed. (1) Coppice with Reserved Working Circle (2) Miscellaneous Working Circle.

KARTAR SINGH'S PLAN (1979-1992):

This plan replaced the working plan of Singh & Majumdar. In this plan the main objects were set as per the guidelines of National Forest Policy and the methods of treatment adopted were on the basis of functional classification of the Forests. This plan prescribed five Working Circles viz.-(1) Conversion Working Circle (2) C.W.R. Working Circle (3) Improvement Working Circle (4) Kuran Working Circle (5) Miscellaneous Working Circle.

CONVERSION WORKING CIRCLE:

The areas allotted to this Working Circle were the better quality forests of site quality mostly of III to IV. All these areas were considered to be suitable for clear felling & raising teak plantations.

COPPICE WITH RESERVE WORKING CIRCLE:

This Working Circle included well stocked Forests of inferior quality capable of producing small to medium sized timbers, poles & firewood. Mostly the forests under this Working Circle were of site quality varying from IV a to IV b with a few small patches of site quality III.

IMPROVEMENT WORKING CIRCLE:

The improvement Working Circle of Kartar Singh's Plan comprised marginal areas which failed to regenerate due to adverse biotic factors. These areas were degraded and were liable to erosion.

B.P.SINGH & ASHOK SHARMA'S PLAN (1993-94 to 2003-04):

This plan replaced the Working plan of Kartarsingh. This Working Plan comprises of the old reserved forest, new reserved forest and remaining protected forest as well as un-notified forest areas. The main object of this plan was to create sustainable forests to meet the regular market demand of timber, poles, firewood and bamboos and also to meet the local needs of the people. The main working circles were formed as follows.

1. Selection cum Improvement Working Circle
2. Afforestation Working Circle
3. NTFP (Overlapping) Working Circle
4. Tussar Working Circle
5. Wildlife (Overlapping) Working Circle
6. Bamboo (Overlapping) Working Circle

During the period of working plan 1993-94 to 2003-04, only 15.97% area of Selection cum Improvement Working Circle, and 19.94% area of Afforestation Working Circle, were worked. However under Afforestation Working Circle out of 13905.91 ha., plantation works were carried out only in 1050 ha. area. NTFP, Tussar and Wildlife Working Circles were not given any importance during the implementation of the plan. Area under Bamboo (Overlapping) Working Circle was mainly worked by the BILT. The details of working is given in the following Table.

Table No.1
**DETAILS OF WORKING CIRCLEWISE AREA WORKED DURING
1993-94 TO 03-04**

Sr.No	Working Circle	Area allotted in Ha.	Area actually worked in Ha. during 93-94 to 03-04	Percentage of Area worked.
1	2	3	4	5
1	Selection cum Improvement Working Circle	148195.86	23661.79	15.97
2	Afforestation Working Circle	69761.22	13905.91	19.94
3	NTFP(Overlapping)Working Circle	218529.08	--	--
4	Tussar Working Circle	572.00	--	--
5	Wildlife(Overlapping) Working Circle	218529.08	--	--
6	Bamboo (Overlapping) Working Circle	120282.57	N.A.	--

During the last 10 years only 241 coupes were worked out of 690 (SCI-490+AWC-200) which were due for treatment under selection-cum improvement working circle and Afforestation Working Circle.

The overall working was not found satisfactory. This resulted in shortfall of revenue and employment generation in the area. The main reasons found for not implementing the works were due to non-availability of funds in time and Naxalite menace.

One year extension was granted by the Government of India for coupe no. XI Even then the work was not taken up within the stipulated time (i.e. before March / 2005).

In Afforestation working circle, felling operations were carried out in 13905.91 ha. area and plantations were carried only in 1054 ha. area out of which 25 ha. was Teak plantation, 574 ha. was bamboo plantations and the remaining 455 ha. was miscellaneous plantations during the last 10 years, under various schemes of plantation as per information given by the Dy. Conservator of Forests, Gadchiroli.

The Gadchiroli Forest Division, has 1836.34 ha. of old teak plantations raised during 1956 to 2001 and these plantations did not receive any silvicultural treatments such as cleaning and thinning. These plantations are heavily infested with climbers. Hence silvicultural operations should be carried out in these old plantations regularly.

More than 60% area of the division is under bamboo and are distributed over 25 felling series, which are worked in 3 year working cycle. The maximum bamboo areas falls under commercial bamboo felling series (CBFS) and the same are worked by the Ballarpur Industries Ltd., whereas nistar bamboo felling series (NBFS) are worked by department to meet the requirement of nistar and the surplus quantity of long bamboo and bundles (2 Meter) are sold in open auction at sale depots. In this plan all old successful bamboo plantations has been included , under the Bamboo overlapping working circle.

Under the scheme of medicinal plants preservation and propagation of FRLHT, Bangalore, 200 ha. of area near Gadmauli in Compartment No. 426 in Chatgaon Range is demarcated and protected from grazing and other human biotic interference, so as to protect and preserve the existing medicinal plants which are identified in the M.P.C.A. list of Maharashtra in Gadchiroli Division.

The statistics of Tiger & Panther is given in the following table.

Table No.-2

CENSUS OF TIGER & PANTHER IN GADCHIROLI DIVISION

Name of the Animal	Year of Census				
	1989	1993	1997	2001	2005
Tiger	4	3	3	0	0
Panther	9	8	6	2	6

B. PROTECTED FORESTS:

Prior to the abolition of proprietary rights, the total rights and ownership of the Protected Forests were vested with Jamindars and Malgujaris. The local people were using the rights and concessions to meet their bonafied needs of timber, firewood, grasses, fencing material and grazing facilities at the pleasure of sole proprietors of the forests. However, some of the villages had the record of rights which were shown in the Wazib-ul-araz.

After abolition of the proprietary rights of Jamindars and Malgujars over this forest, all the rights were vested with the State Government. The first working scheme of these forests were prepared by V.K.Prabhu which was brought under implementation since 1965-66 prior to that, these forests were not

managed under any kind of silvicultural systems. This working scheme covered the areas of Kurkheda, Dhanora and Gadchiroli ranges of the East Chanda Division. After re-organization of East Chanda Division, Dhanora and Gadchiroli ranges were divided into four ranges namely 1. Gadchiroli 2. Chatgaon 3. Dhanora and 4. Murumgaon. The main objectives of this scheme were as follows.

1. To bring maximum area of ex-proprietary forests under scientific management.
2. To improve the health as well as economic value of the forest through plantations and preferential treatment.
3. To satisfy the local nistar demand of Forest Produce.
4. To arrest soil erosion and to improve the productivity of the soil.

Treatments were given based on the functional classification of the forests, accordingly four working circles were formed viz. SCI, CWR, Minor Forest Working circle, and Bamboo overlapping working circle. All good quality miscellaneous forests, forests with dense bamboo and forests situated on hills were kept under S.C.I. Forests near human settlements were allotted to C.W.R. system and forest areas around cultivation and occupied areas were allotted to Minor Forest Working Circle, and all forest areas having good quality bamboo were allotted to Bamboo overlapping Working Circle.

RESULTS OF PAST WORKING:

- (i) All good tree forests with economic value were brought under S.C.I. and C.W.R. Working Circles.
- (ii) The compartments formed included forest as well as non-forest areas. This give rise to serious protection problems. Protected Forests in the vicinity of villages as a consequence of this suffered from large scale encroachments.
- (iii) In C.W.R. Working Circle a number of species have diminished. These included *Ain*, *Bija*, *Moha*, *Beheda*, *Khair* and *Semal* as well as host of other species which are poor to no coppicers or which coppice only up to a certain age.
- (iv) Analysis of maps prepared at that time, reveals large scale pantographic errors.
- (v) No soil conservation measures were carried out though prescribed during the plan period, due to which soil erosion has accelerated.
- (vi) Enough importance was not given for the scientific management and improvement of NTFP.
- (vii) Age old tussar cultivation practice was ignored.
- (viii) Normalcy of forests could not be achieved.

STATISTICS OF GROWTH :

Growth study was done by Kartar Singh during the preparation of Working Plan for East Chanda Forest Division. As per stump analysis, teak can attain girth of 150 cm in 108 years whereas *Bija*, *Ain*, *Bhirra*, *Dhaora* and *Tendu* can attain girth of 135 cm in 112 years, 120 cm in 122 years, 135 cm in 108 years, 135 cm in 123 years and 135 cm in 120 years respectively. As per the enumeration data, the number of stems per ha in SCI Working Circle of V.K.Prabhu's scheme is 303.

WILDLIFE PRESERVATION :

Wildlife was managed under various rules and regulations, framed time to time till enactment of the wildlife (Protection) Act, 1972. This Act came into effect in Maharashtra with effect from 1st June, 1973. Subsequently, various rules were framed under this Act. No shooting blocks exists in Gadchiroli Forest Division. Compensation is paid to the cattle owners in case of death due to attack by tiger, panther and other wild animals. Compensation is also paid to the human life in case of death or injury caused by Tiger, Panther and other wild animals.

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PART – II

BASIS OF PROPOSALS

PRESCRIPTIONS OF THE PLAN BASED ON :

1. NATIONAL FOREST POLICY 1988 :

Under this policy more emphasis is laid on the maintenance of environment stability, conserving national heritage, checking soil erosion in all catchment areas of rivers, increasing the tree cover through massive afforestation, meeting the requirement of firewood, fodder, small timber and minor forest produce to rural and tribal people, efficient utilization of forest produce and people's involvement to achieve these objects.

2. NATIONAL WILDLIFE ACTION PLAN:

The National Wildlife Action Plan had outlined the strategies and action points for wildlife conservation. Biodiversity conservation has also become a focus of interest in National Wildlife Action Plan. The strategy for action includes.

- (i) Strengthening and enhancing the Protected Area Network.
- (ii) Effective Management of Protected Areas.
- (iii) Conservation of Wild and endangered species and their habitats.
- (iv) Restoration of degraded habitats outside the protected areas.
- (v) Control poaching, taxidermy and illegal trade in wild animal and plant species.
- (vi) Monitoring and Research.
- (vii) Human resource development and personnel planning.
- (viii) Ensuring people's participation in wildlife conservation.
- (ix) Conservation awareness and education.
- (x) Wildlife Tourism.
- (xi) Domestic legislation and international conventions.
- (xii) Enhancing financial allocation for ensuring sustained fund flow to the wildlife sector.
- (xiii) Integration of National Wildlife Action Plan with other sectoral programmes.

3. NATIONAL FORESTRY ACTION PROGRAM:

To reverse the process of degradation and for sustainable development of forests, the Government of India has prepared National Forestry Action Plan (NFAP), a comprehensive strategic plan to solve the major issues of the forestry sector. The objective of the NFAP is to enhance the forest resources and ecological stability qualitatively and quantitatively.

The objective of NFAP is to evolve issue based programs in the line of provisions of the National Forestry Policy, 1988. It is to integrate the forestry development programs in the country within the framework of National Five Year Plans. Five inter-related basic issues have also been identified and these are the basis of the following program structure.

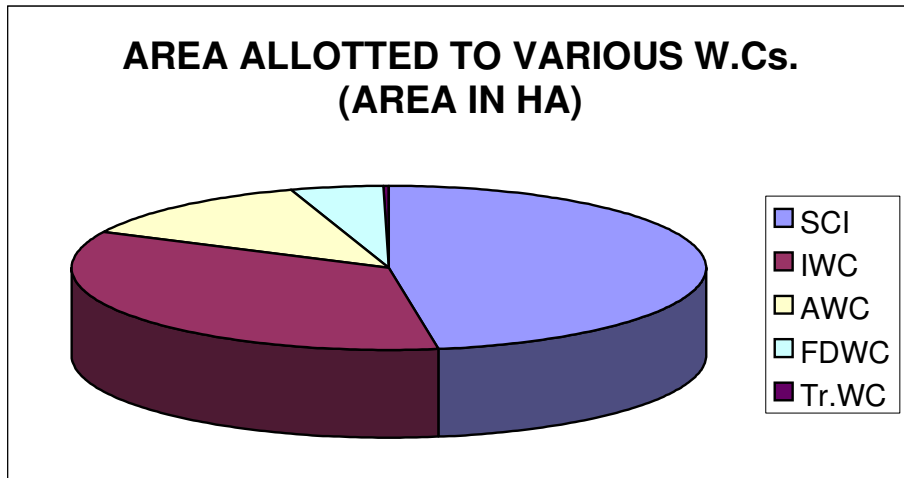
- I. Protect the existing forest resources.
- II. Improve forest productivity.
- III. Reduce total demand.
- IV. Strengthen the policy and institutional framework.
- V. Expansion of forest areas.

4. CONSTITUTION OF WORKING CIRCLES :

The whole area of Gadchiroli Forest Division is divided in to 6 working circles and percentage of the area allotted is shown against each working circle:

Table No.- 3
Area allotted to different Working Circles

Sr. No.	Name of the Working Circle	Area allotted in ha.	% of total area of the division.
1	Selection-Cum-Improvement Working Circle	103556.14	47.39%
2	Improvement Working Circle	76108.13	34.83%
3	Afforestation Working Circle	27867.04	12.75%
4	Fodder Development Working Circle	10425.96	4.77%
5	Tussar plantation Working Circle	572.00	0.26%
6	Bamboo (Overlapping) Working Circle	138858.91	63.54%
7	Wildlife (Overlapping) Working Circle	218529.27	100%
8	Non-Timber Forest Produce (Overlapping)Working Circle	218529.27	100%
9	Joint Forest Management (Overlapping) Working Circle	218529.27	100%



I. SELECTION-CUM-IMPROVEMENT WORKING CIRCLE :

Total Area : 103556.14 ha.
 Felling cycle : 20 years
 Felling series : 52 felling series.

Selection girth : 1) *Teak, Ain, Bija, Shisam and Haldu* :- 120 cm.
 2) *Garari, Lendia* :- 45 cm.
 3) Other timber species :- 90 cm.

Regulation of yield : Yield will be regulated by area.

Demarcation : Coupes will be demarcated one year in advance of main felling.

Treatment map : Treatment map will be prepared by the Range Forest Officer. It will show the following areas.

Type-A : Protection areas with a gradient of 25 degrees & more.
 Type -B : Under stocked areas (less than 0.4 density)
 Type -C : Group of young poles and old Teak plantations.
 Type -D : Well stocked areas. (0.6 density and above)

MARKING TECHNIQUE :

Type A Areas (Protection area):

No marking will be carried out.

Type B Areas (Under stocked area):

Only dead and dying trees will be marked after retaining two dead trees per ha.

Type C Areas(Young crop):

Thinning marking will be done to bring the average space equal to $1/3^{\text{rd}}$ of the average height of the crop. In plantations thinning will be done as per the quality classes and age.

Type D Areas(Well stocked areas):

All edible fruit and flower yielding trees such as *Mohua*, *Char*, *Tendu*, *Aola*, *Chinch*, *Sitafal*, *Hirda*, *Behda*, *Bel* and trees of *Kulu* and trees of medicinally important and endangered species will be reserved from felling. All trees above selection girth prescribed for each species and approach class will be enumerated, before marking, in 15 cms girth classes. Marking will be done as per the following procedure:

- (i) The percentage of selected trees to be marked for felling for various species/ groups has been worked out in regulation of yield. Fifty percent of the trees above exploitable girth class will be marked for felling. Marking will start from the highest girth class trees and trees of less importance.
- (ii) All dead and malformed trees, after retaining 2 dead trees/ha will be marked for felling. A tree will be treated as malformed if it does not have a clean bole of trunk at least 2 Mt. above the breast height.
- (iii) All live and dead high stumps will be marked for felling.
- (iv) At least one vigorously growing coppice shoot will be retained. In case the stool height is more than 6 inches it should be cut close to the ground and dressing will be carried out to facilitate coppice.
- (v) No sound tree will be removed unless it is silviculturally available.
- (vi) 50 % trees above selection girth shall be retained species-wise and retained trees will be distributed uniformly over the area of the coupe. Marking for felling will start from the highest girth class and trees of less importance.

MARKING RULES :

Marking will be done under the close supervision of the Range Forest Officer and the same will be verified by the Assistant Conservator of Forests in charge without fail. Details of marking rules are given in the Chapter "Other Important regulations".

CUT-BACK OPERATIONS :

These operations will be carried out departmentally in the year following the year of main felling.

CLOSING OF THE AREAS:

All the coupes worked under this working circle shall be closed for grazing up to 5 years or till the establishment of young regeneration.

CLEANING :

Cleaning operation will be carried out in the 6th year of main felling to facilitate the young crop for better growth.

II. IMPROVEMENT WORKING CIRCLE:

Total Area : 76108.13 ha.

Felling Cycle : 20 years.

Felling Series : 36 felling series.

Method of Treatment : The main aim of this working circle is to improve the quality of the existing crop by providing hygienic felling operations through removal of dead, dying, diseased and malformed trees. Thinning and singling operations in congested patches of young crop shall be carried out. Plantations in blank areas of 5 ha. or more in continuous patch will be taken up at a spacing of 2 x 2 mt. Teak will be preferred based on the site quality and soil type.

Treatment map : Treatment map will be prepared by the Range Forest Officer by showing the following areas.

Type A Area : Protection areas with a gradient of 25 degrees and more.

Type B Area : Under stocked areas (less than 0.4 density)

Type C Area : Group of young poles and old plantations.

Type D Area : Well stocked areas. (0.6 and above density)

MARKING TECHNIQUE :**Type A Areas (Protection area) :**

No marking will be carried out.

Type B Areas (Under stocked area) :

Only dead and dying trees will be marked after retaining two dead trees per ha.

Type C Areas(Young crop):

Thinning marking will be done to bring the average space equal to $1/3^{\text{rd}}$ of the average height of the crop. In plantations thinning will be done as per the quality classes and age.

Type D Areas(Well stocked areas):

All edible fruit and flower yielding trees such as *Mohua*, *Char*, *Tendu*, *Aola*, *Chinch*, *Sitafal*, *Hirda*, *Behda*, *Bel* and trees of *Kulu* and trees of medicinally important and endangered species will be reserved from felling. Marking will be done as per the following procedure:-

- (i) All dead and malformed trees, after retaining 2 dead trees/ha will be marked for felling. A tree will be treated as malformed if it does not have a clean bole of trunk at least 2 Mt. above the breast height.
- (ii) All live and dead high stumps will be marked for felling.
- (iii) At least one vigorously growing coppice shoot will be retained. In case the stool height is more than 6 inches it should be cut close to the ground and dressing will be carried out to facilitate coppice.
- (iv) All climbers and unwanted species interfering with the existing crop and young regeneration shall also be marked for felling.

MARKING RULES :

Marking will be done under the close supervision of the Range Forest Officer and the same will be verified by the Assistant Conservator of Forests. Details of marking rules are given in the Chapter "Other Important Regulations".

CUT-BACK OPERATIONS :

These operations will be carried out departmentally in the year following the year of main felling.

CLOSING OF THE AREAS:

All the coupes worked under this working circle shall be closed for grazing up to 5 years or till the establishment of young regeneration.

CLEANING :

Cleaning operation will be carried out in the 6th year of main felling.

III. AFFORESTATION WORKING CIRCLE :-

Total Area : 27867.04 ha.

Felling Cycle	: 20 years.
Felling series	: 14 Felling Series.
Choice of species	: <i>Teak, Bija, Shisam, Ain, Shivan, Aola, Hirda, Behada, Ber, Mohua, Bamboo, Khair, Siras, Jamun, Arjun</i> , Fodder grasses and any other species as per the site specific requirement
Regulation of yield	: No appreciable yield is expected.
Demarcation & Marking	: Main Afforestation coupes will be demarcated and marked one year in advance.
Treatment map	: Treatment map will be prepared by the Range Forest Officer, by showing the following areas.
Type A	: Protection areas with a gradient of 25 degrees and more.
Type B	: Under stocked areas (less than 0.4 density)
Type C	: Group of young poles and old plantations.
Type D	: Well stocked areas. (0.6 and above density)

MARKING TECHNIQUE :

Type A Areas (Protection area):

No marking will be carried out.

Type B Areas (Under stocked area) :

Only dead and dying trees will be marked after retaining two dead trees per ha.

Type C Areas (Young crop):

Thinning marking in type C areas will be done to bring the average space equal to $\frac{1}{3}^{\text{rd}}$ of the average height of the crop. In plantations thinning will be done as per the quality classes and age.

Type D Areas (Well stocked areas):

No marking will be done. However, only dead, dying, diseased and windfall trees will be marked for felling.

MARKING RULES :

Marking will be done under the close supervision of the Range Forest Officer and the same will be verified by the Assistant Conservator of Forests. Details of marking rules are given in the Chapter "Other Important Regulations".

CUT-BACK OPERATIONS :

These operations will be carried out departmentally in the year following the year of main felling.

CLOSING OF THE AREAS:

All the coupes worked under this working circle shall be closed for grazing up to 5 years or till the establishment of young regeneration.

CLEANING :

Cleaning operation will be carried out in the 6th year of main felling to facilitate the young crop to get establish.

METHOD OF TREATMENT :

Areas allotted to afforestation working circle shall be thoroughly inspected by the Assistant Conservator of Forests, and site specific treatment map will be prepared at least one year before the planting season and the same will be submitted to the Dy. Conservator of Forests. The Dy. Conservator of Forests will further inspect the area and if he is satisfied with the treatment map he will give the technical sanction. The primary object of management of these areas is to restore the soil fertility and to increase the productivity of soil. The species to be planted will depend upon the soil type, its depth and local requirements. The number of plants per/ha will be 2500. No regular silvicultural system will be applied. The existing growth will be tended by carrying out suitable cleaning and thinning operations. The rooted stock present in the area which have been constantly hacked for firewood will be cut closed to the ground and stump dressing will be done to facilitate the production of coppice shoots. All the sloppy areas will be treated by providing soil and moisture conservation works and soil binding species shall be planted.

NURSERY PREPARATION:

Success of any plantation depends on the health and vigour of the seedling. The seedlings shall be raised at least six months in advance in case of root trainer seedlings and at least 10-12 months in advance in case of poly-bag seedlings/teak root-shoot. In case of bamboo one year old seedlings with fully developed rhizomes raised from the seed origin shall be used.

PLANTING TECHNIQUES:

Before starting pre-planting operations area should be surveyed and alignment /stacking operations shall be carried out after cleaning the site.

Pits shall be marked at 2 Mt. X 2Mt. distance which shall be dug latest by January and pits should be allowed for weathering. Size of the pit shall be 30 x 30 x 30 cms. for all the species. Re-filling of pits up to $\frac{3}{4}$ depth will be carried out before the onset of Monsoon. At the time of re-filling of pits a dose of 50 grams of DAP per pit is recommended for the growth and development of seedling. Care should be taken to put only top soil with good humus while re-filling the pit. Planting operations shall be strictly carried out in time. Any delay in planting may cause series problems in establishing the seedlings. Late plantings leads to more casualties which may lead to even failure of the plantation. Rainfall data shall be maintained in the plantation register up to 5 years to avoid any future problem in case of excess casualties.

SUBSIDIARY SILVICULTURAL OPERATIONS:

- (i) All the coppice shall be thinned every year by retaining one promising shoot till the plantation reaches 5th year.
- (ii) All the climbers, thorny bushes and unwanted shrubs causing hindrance to the growth of the plantations shall be cut close to the ground.
- (iii) Cleaning and singling operations are prescribed during 5th and 7th year of plantation.

FIRE TRACING:

All the plantations raised under this Working Circle shall be provided with fire tracing works every year till it reaches 5th year. Thereafter the area shall be included in the annual fire control programme.

IV. FODDER DEVELOPMENT WORKING CIRCLE:

Total Area	: 10425.96 ha.
Felling Cycle	: 20 years.
Felling Series	: 5 felling series.
Method of Treatment	: The main aim of this working circle is to provide fodder and fuel wood to the local communities through raising good variety of fodder grasses and high calorific value fuel wood plantations in the adjoining degraded forest lands and to reduce pressure on the forests for the purpose of fodder and fuel wood.

V. TUSSAR PLANTATION WORKING CIRCLE:

Total Area	: 572.00 ha.

Method of Treatment : The main aim of this working circle is to provide employment to the local communities who practice rearing of Tussar silk on naturally grown *Ain*, *Arjun* by continuous pollarding the trees season after season. By raising Tussar plantations (*Ain* & *Arjun*) pressure on the natural *Ain* and *Arjun* crop can be reduced.

VI. BAMBOO (OVERLAPPING)WORKING CIRCLE:

Total Area : 138858.91 ha.
 Felling Cycle : 3 years.
 Felling Series : 27 felling series.

Method of Treatment:

The main aim of this working circle is to provide cleaning and silvicultural removal of bamboo available in each clump and to facilitate the regeneration of culms and to remove congestion. The species of bamboo occurring in Gadchiroli Forest Division is mainly *Dendrocalums Strictus*. However, *Bambusa arundinacea* (Katang bamboo) can also be seen in scattered patches along the nala banks in some areas. Both the commercial bamboo felling series and nistar bamboo felling series will be worked in 3 years cycle to meet the nistar and commercial requirements of the area. Bamboo Working provides major employment to the local population between October to May in each year. Successful old bamboo plantations have also been included in this working circle and they also will be worked in three year's cycle by forming A,B,C coupes.

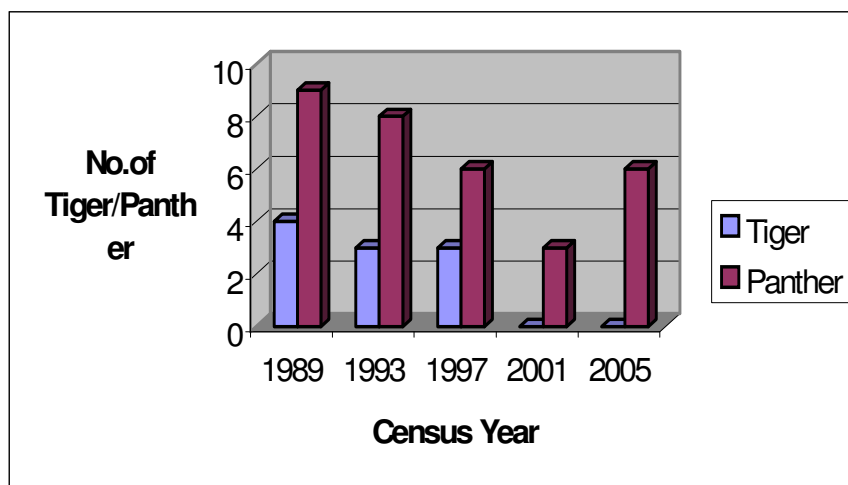
VII. WILDLIFE (OVERLAPPING) WORKING CIRCLE :

Area of operation:

The area of operation of this working circle is extended to the whole area of Gadchiroli division. The main species of animals that are mainly found are ***Tiger, Panther, Hyaena, Wild dog, Wolf, Jackal, Fox, Jungle cat, Bison, Sambar, Chital, Nilgai, Wild boar, Sloth bear, Barking deer, Common langoor, Flying squirrel, Porcupine and hare.*** The population of Carnivores such as Tiger and Panther is depleting year after year in Gadchiroli Forest Division. Tiger census carried out from 1989 to 2005 shows the trend of decrees of carnivores population, which clearly indicates that there is a direct threat to these animals due to illegal poaching.

Census of Tiger/Panther in Gadchiroli Division

Name of Division	Name of the Animal	Year of Census				
		1989	1993	1997	2001	2005
Gadchiroli	Tiger	4	3	3	0	0
	Panther	9	8	6	3	6



The above graph shows the alarming situation in decrease of Tiger/Panther population.

To protect wildlife in Gadchiroli Division, all the provisions made under Indian Forest Act, 1927 and Wildlife (Protection) Act, 1972 for protection, conservation and management of wildlife should be followed strictly. A list of all the major wild animals existing in Gadchiroli Division shall be maintained in all the range offices and division office. Compensation to the cattle kill cases and compensation to the individuals in case of any injury or death caused by wild animals such as Tiger/Panther, Bear and other wild animals shall be promptly paid without delay.

Compartment wise survey is to be conducted to identify the permanent /seasonal waterholes and the same is to be maintained. Deepening through de-siltation and strengthening of water holes shall be taken up under various schemes. This will help to provide water to the wild animals in all the seasons and also helps in preventing the migration of wild animals to outside the forest area.

Water holes should be hygienic and all the cattle in the villages should be vaccinated to prevent the spread of contagious disease. This should be done during every summer season with the help of Animal Husbandry Department. Any laxity in this regard may cause serious health hazard to wildlife due to endemic diseases.

Saltlicks may be provided around the waterholes and grasslands for the benefit of the wildlife. In areas wherever grasses are absent naturally, good palatable grasses through fodder plantations may be taken up in order to increase the availability of fodder to the wildlife so as to prevent the migration of wild animals to outside the forest areas.

Awareness programs are to be taken up in and around the forest areas to educate the people about the protection of wild animals, and their role

in maintaining the ecological balance. This may be extended to all the schools, colleges and village panchyats and offices and places where public gathering takes place. Help of Forest Protection Committees, J.F.M. Committees, may be taken to protect and conserve the wildlife.

Better co-ordination is to be maintained by Dy. Conservator of Forests, with all the law enforcing departments including Police, Excise, etc. to prevent the smuggling of trophy of wild animals. The help of Tiger Cell established under the Chairmanship of Superintendent of Police at district level may be taken to prevent and control poaching and illegal trade of wild animals and its trophies.

A strict vigil is to be maintained by all the field staff to prevent organized poaching activities by regular patrolling in sensitive areas. The list of habitual poachers and illegal traders and their photographs is to be maintained in all the range offices and division office. Wide publicity shall be given to prevent the mobility of such habitual offenders.

Rewards are to be promptly paid in case of genuine informers who give reliable information regarding poaching and illegal trade of wild animals and its articles.

VIII. NON TIMBER FOREST PRODUCE (OVERLAPPING)WORKING CIRCLE :

Total area : 218529.27 ha.

Method of treatment :

This working circle is extended to the whole area of the division in which minor forest produces such as gum (*Kullu, Dhawda, Ain, Salai, Siras, Neem, Babul etc*) *Mohua* flowers & seeds, *Hirda, Behada, Aola, Ber fruit, lac* (*Palas, Kusum, Ber*), *broom-grass, honey, Sitafal, Dikamali*, *Neem seed* and other important locally available medicinal plants etc. are naturally produced in different seasons of the year. These produces are locally collected by the people and are sold to the collection centers established by the Maharashtra State Co-operative Tribal Development Corporation (MSCTDC). All such non-timber forest produces are sold through auction and the royalty is paid to the State Government. The profit obtained through sale of non-timber Forest produce is distributed to all the collectors of non-timber forest produce as bonus. However, as per the 73rd amendment of the Indian constitution, the rights of Non-timber Forest Produce are vested in the Gram-sabhas. Hence the royalty over the minor forest produce which is paid to the state is to be paid to the Gram-sabhas through Rural Development department. To facilitate smooth functioning of this enterprise the whole division is to be divided in to different units which will co-inside with the territories of Gram-sabha so as to reach a common memorandum of understanding / agreement between the MSCTDC and the Gram-sabha. However, as per the above amendment the Gram panchayats have not replaced with the Gram-sabhas in scheduled areas till now. This needs a clarification from the government level (Rural Development/Tribal Development Department) on top priority basis. Unit

wise targets, quantum of collection-sale-disposal of non-timber forest produce, collection center wise list of collectors and sellers etc. shall be maintained in the form of permanent record at Gram-sabha level and copy of the same shall be maintained in the office of Dy. Conservator of Forests, and Regional Manager, MSCTDC so as to keep control in the whole process. Similar procedure can be laid down for the Gram- panchayat out side the scheduled areas so as to utilize the total quantity of non-timber forest produce. The items of NTFP which are not notified by the MSCTDC shall also be collected through the formation of local women self-help groups . This will help the forest department in knowing about the total productivity of NTFP in its areas. This can also help in the generation of seasonal employment to all communities living in and around the forest areas.

Regulation of yield : Yield will be regulated by area.

IX. JOINT FOREST MANAGEMENT(OVERLAPPING)WORKING CIRCLE:

Total Area : 218529.27 ha.

Period of operation : 20 years

Method of Treatment :

The main aim of this working circle is to provide the participatory management of forests & wildlife by involving local people. J.F.M. activity is extended to the whole area of Gadchiroli division since 1992 and in 106 villages forest protection committees have been formed. About 48004.79 ha. forest area has been assigned to 106 Forest Protection Committees for protection and management as per the provisions of G.R.No.SSL/1091/Case No.119/Desk-11 dated 16.03.1992. The Forest Protection Committees should be encouraged in protection matters by frequent dialogues with them.

MISCELLANEOUS REGULATIONS : DEMARCATON OF COUPES :

Demarcation of coupes shall be carried out one year in advance of main felling. All the annual coupes will be demarcated by clearing 3 Mt. wide lines and by erecting pillars or posts on the boundary lines. The distance between the 2 pillars will be such that they should be clearly visible from one another. Selected trees on the periphery will be given two coaltar bands and a serial number. Unworkable areas will be demarcated by giving two geru bands and a cross in geru colour between two bands and a serial number on selected trees on the periphery of the coupe.

In case of larger coupes, for the purpose of convenience the area is to be divided into equal number of sections. All such sections shall not exceed 20 ha. of area. A section line of 5 ft. width is to be cleared in straight lines and pillars are to be erected at visible distance in the center of the line. In addition to this, trees standing on the 5 ft. section line will be given with 2 coaltar bands at breast height and appropriate section number is also written by

providing a blaze. These sections are to be clearly shown on the treatment map prepared for the purpose of exploitation.

MARKING TECHNIQUE :

Marking of annual coupes shall be carried out one year in advance of the main felling.

- (i) A clean blaze of 4-6" square, by removing bark, shall be made on all the trees to be marked for felling both at breast height and also at the bottom of the tree. A digital Serial No. along with the impression of marking hammer at the center of blaze shall be given, on all the trees marked for felling. This will be done on trees having the gbh of 45 cmt. and above. The trees marked for felling will also have a geru band at breast height.
- (ii) In case of trees to be reserved, a coaltar band is to be given at breast height.
- (iii) A detailed record of marking register is to be maintained in printed format which will be a permanent record.

FELLING-LOGGING RULES:

Before starting exploitation of coupes, the Range Forest Officer shall give a live demonstration of felling techniques to all the staff and labourers involved in the felling, logging, measurement and record maintenance. Care should be taken to have the tool box and first aid box at all the working sites. The following are the rules of felling to be observed during exploitation.

- (i) Before starting felling the tree, all the bushes around the tree should be cut so as to facilitate passage in case of emergency.
- (ii) Felling direction shall be decided such that no nearby trees shall be damaged.
- (iii) Stump height should be closer to the ground as far as possible and in no case it should exceed more than 6" in height.
- (iv) Felling sink and felling cut are to be provided very clearly to avoid any split of the trunk of tree.
- (v) Dressing of stumps is to be done by axe on all sides.
- (vi) After felling a tree, all the branches are to be cut with the help of bow saw and the same will be converted into firewood pieces having length of 1.20 Mt. Straight branches having more than 45 cms. girth may be converted into chalk timber (Carpentry Material).

- (vii) The main trunk will be divided into different sections by giving a chalk-mark by the forester in-charge of the coupe. Logging of the trunk will be done by providing a cross cut at each chalk-mark. Care should be taken that all the cross-cuts should be straight in nature.
- (viii) After logging the digital number showing marking number of the tree and sections divided from that tree will be given on the stump after dipping digit set in a coaltar for clear visibility. Measurements of the logs are also to be shown by putting digit nail numbers.
- (ix) A paste of geru cooked with bel fruit extract shall be applied on both the surfaces of the logs to prevent cracks.
- (x) All the logging, felling, measurement registers shall be maintained at the coupe depot and the same are to be verified by the Range Forest Officer concerned and Assistant Conservator of Forests, in-charge.

MAINTENANCE OF COUPE DEPOT:

As soon as the exploitation starts, coupe depot/jungle depot are to be identified within the limit of 0-3 Km. from the coupe and the same is to be cleaned and fire traced properly. A good cart-road is also to be prepared to transport the materials from jungle depot to sale depot.

TRANSPORTATION OF THE MATERIAL:

A detailed transportation plan is to be prepared to transport the timber and firewood from jungle depot to various sale depots. The distances between the jungle depot to sale depot is to be measured and certified by the Assistant Conservator of Forests. The transportation of timber may be carried out either by the departmental trucks (if available) or through private transporters after following the due official procedures laid down. However, fuel beats below 30 cms. may be distributed to the local people through nistar if there is a demand.

DISPOSAL OF FOREST PRODUCE :

After completion of transportation of timber, poles, firewood, bamboo and bamboo bundles to various sale depots located in the division monthly sales of the same will be conducted through open auction by the Dy. Conservator of Forests, regularly. There should not be any delay in the sale of forest produce as it affects the regular flow of revenue. All the sales are to be personally conducted by the Dy. Conservator of Forests without fail.

IRREGULAR HARVESTING :

The estimates of dead and wind-fallen materials should be prepared beat wise and removal of the same shall be carried out every year through out the division. Felling of trees on fire lines shall be carried out. Felling

of trees for the purpose of growth study will be done. Trees which are over matured and causing hindrance in nursery activity, causing damage to the buildings and property of the department are to be properly marked and removed as and when situation arises. The record of the same may be maintained in the beat books and an entry shall be made in the compartment history forms.

MAINTENANCE OF BOUNDARIES :

The RCC cairns/pillars of approved size and design will be prepared and fixed on the external boundary of the division after making a scheme of 1/5th boundary demarcation which will be sanctioned by the Conservator of Forests. Budgetary provisions are to be made annually for this purpose and this works are to be attended on top priority.

FIRE PROTECTION :

A detailed fire protection scheme is to be prepared for the whole forest area of the division including the plantations. All the fire lines are to be regularly cut, burnt and maintained. No trees, pole crops and bamboo should be allowed to grow on the fire lines. However, fruit trees or shade giving trees may be retained at a distance of 200 Mt. in case of fire lines which runs on both the sides of the roads. If trees are existing on any fire line/compartment boundary line, they are to be properly marked and estimates are to be prepared and the same may be felled after proper approval from the Conservator of Forests.

Fire protection works shall be implemented departmentally or it may be entrusted to the JFM committees/ Forest protection committees after preparing a memorandum of understanding with certain terms and conditions to protect the areas from fires. The cost of fire protection works shall be paid to the committee at the end of fire season.

In case of any incidence of fire occurrence the details of damage is to be regularly intimated to the Dy. Conservator of Forests by the Range Forest Officer without fail. Maximum care is to be taken to prevent the fires. Awareness program to prevent forest fires may be conducted in all the villages in and around the forest areas, by explaining the losses caused due to fires such as damage to flora and fauna, burning of leaf material and grasses which prevents formation of the humus and top soil, compaction of soil which may lead to erosion and siltation of water bodies in and around the forest areas which may further cause water shortage.

GRAZING :

Worked coupes in all the working circles will remain closed for grazing, at least for 5 years from the year of main felling so as to allow the young regeneration to establish. This is to be strictly followed at all levels.

SOIL AND MOISTURE CONSERVATION WORKS :

Continuous contour trenches, check dams, Vantalao and nala bunding works shall be carried out under different schemes available at district level, to prevent water shortage in forest areas.

LABOUR:

The majority of population of the Gadchiroli district are mainly dependant on seasonal agricultural works. After that they are dependant on forestry works to meet the employment needs. The present position of FLCS may be strengthened by increasing technically trained labourers for logging and felling works.

CONTROL FORMS AND RECORDS:

All the prescribed records are to be maintained as per the procedure laid down in the Chapter X of the National Working Plan Code June/2004. The details of the formats of control forms are given in the **Appendix No. LXIX of Volume II.**

COMPARTMENT HISTORIES :

Compartment history Forms number from 1 to 5 shall be maintained in the division and range offices. The details of the formats of compartment history forms have been given in **Appendix No. LXX of Volume II.**

PLANTATION AND NURSERY REGISTERS :

Plantation and nursery registers shall be maintained in the standard formats and will be kept in the Division as well as in the Range Office. Regular entries regarding various operations carried out, inputs given expenditure and other details are to be made by the Range Forest Officer and the same shall be shown to the senior officers during inspection for their remarks and guidance. The detailed formats of plantation and nursery register have been given in **Appendix No.LXXII & LXXIII of Volume II.** .

DIVISIONAL NOTE BOOK :

This will be maintained in the standard formats and will be kept in the Division office as well as in the Range Office.

ANNUAL PLAN OF OPERATIONS:

A record of Annual Plan of Operations (APO) is to be maintained in all the Range offices and Division office. This will help to keep the track of various operations to be carried out in the division from time to time and also to control the expenditure through out the year.

I. ABBREVIATIONS USED IN THE PLAN	
a.m.s.l.	Above mean sea level
A.P.C.C.F.	Additional Principal Chief Conservator of Forests
A.C.F.	Assistant Conservator of Forests
A.P.O.	Annual Plan of Operation
b.h.	Breast height
B & C	Buildings and Construction (Department)
C.A.I.	Current Annual Increment
C.C.F.	Chief Conservator of Forests
C.E.C.	Central Empowered Committee.
Cft.	Cubic feet
CG	Centigrade
CM	Centimeter
Cm ³	Cubic centimeter
Comptt.	Compartment
d.b.h.o.b.	Diameter at breast height over bark.
d.b.h.u.b.	Diameter at breast height under bark.
Dy.C.F.	Deputy Conservator of Forests
Dn.	Division
E.G.S.	Employment Guarantee Scheme
F.C.A.	Forest (Conservation) Act, 1980
F.D.A.	Forest Development Agency
F.D.C.M. Ltd.	Forest Development Corporation of Maharashtra Ltd.,
F.L.C.S.	Forest Labour Co-operative Society
F.R.H.	Forest Rest House
F.R.L.H.T.	Foundation for Revitalization of Local Health Traditions.
F.S.	Felling Series
F.S.O.	Forest Settlement Officer
F.V.	Forest Village
F.Y.M.	Farm Yard Manure
g.b.h.	Girth at breast height
g.b.h.o.b.	Girth at breast height over bark
g.b.h.u.b.	Girth at breast height under bark
G.O.I.	Government of India.
G.P.S.	Geographical Position System
G.I.S.	Geographic Information System
G.R.	Government Resolution.
Ha.	Hectare
IGF	Inspector General of Forests
IFA	Indian Forest Act.
JFM	Joint Forest Management
KM	Kilometer
Kg	Kilogram

m.	Meter
Mm	Millimeter
M3/m3	Cubic meter
M.A.I.	Mean Annual Increment
M.P.C.A.	Medicinal Plants Conservation Areas.
M.S.T.D.C.	Maharashtra State Tribal Development Corporation Ltd.,
M.S.L.	Mean Sea Level
M.V.S.S.	Maharashtra Van Sanshodhan Sanstha
N.F.A.P.	National Forest Action Plan.
N.T.F.P.	Non Timber Forest Produce
N.W.A.P.	National Wildlife Action Plan
OWR	Over Wood Removal
P.B.	Periodic Block
P.C.C.F.	Principal Chief Conservator of Forests
P.F.	Protected Forests
P.P.O.	Pre Planting Operations.
P.Y.O.	Preliminary Year Operations
P.W.D.	Public Works Department
R.F.	Reserved Forests
R & F D	Revenue & Forest Department
R.F.O.	Range Forest Officer
Rs.	Rupees
S.C.I.	Selection-Cum-Improvement
S.M.C.	Soil & Moisture Conservation
Sq.	Square
Sq.km.	Square Kilometer
Spp.	Species
S.R.P.	State Reserved Police
S.Y.O.	Second Year Operations
Sr.No.	Serial Number
T.C.M.	Trench-Cum-Mound
T.Y.O.	Third Year Operations
T.S.P.	Tribal Sub-Plan
W.C.	Working Circle
W.P.	Working Plan
W.P.O.	Working Plan Officer
Z.P.	Zilla Parishad
IV th Y.O.	Fourth Year Operations
Vth Y.O.	Fifth Year Operations.

II. GLOSSARY OF LOCAL TERMS

Adjat species	Miscellaneous species
Bhatti	Local distillery for liquor production
Bidi	Hand made cigarette wrapped by tendu leaf
Bir	An area reserved to grow grass
Burad	A caste whose main occupation is to make articles from bamboo
Doh	A deep pond in a river or stream
Geru	Red earth
Ghan	Local crusher for oil extraction
Ghat	A road with a steep gradient
Gully	Water channel
Jagir	An estate conferred by the state in return for service
Jagirdar	The holder of jagir
Jamindari	An estate belonging to a zamindar
Jharas	Temporary small wells dug in nalas during summer.
Juar	A cultivated millet(Sorghum vulgaris)
Kacha(roads)	Temporary(roads)
Kankar	Lime nodules
Karka	Whippy bamboo
Katha	Catechu
Kharif	Monsoon crop
Khasara No	Serial number given to any portion of land entered in land records
Khories	Valleys in between two hills or hillocks
Malguzari	Land tenure system which existed in Vidarbha
Malki Land	Lands belonging to private individuals.
Mouza	A village area
Murum	A reddish hard soil
Myrabolons	Aonla, Hirda and Beheda
Naka(Forest)	Barrier on road for checking forest produce in transit
Nala	A water course
Nistar	Forest produce required for bonafide agricultural or domestic purposes
Nistar Patrak	Record of rights on Government Land.
Occupational Nistar	The nistar granted to village craftsman i.e. Nistar mahars, blacksmiths, chamars etc. at concessional rate for their craft purposes.
Paidawar	Wild edible flowers, fruits or roots
Patwari	Village Officer(Sub-ordinate of Revenue Department)
P.C.No	Patwari Circle Number
Pucca	Permanent Construction
Pulla	Bundles of cut grass
Rabi	Winter Crop
Rahadari	Transit
Raiyatwari	A form of land tenure,applied to land in raiyatwari tenure and to villagers.
Regur	Block cotton soil.
Rith	A deserted village site
Satkatha	Miscellaneous tree species
Seri-culture	Rearing silk/tussar worms

**LOCAL AND BOTANICAL NAMES OF PLANTS
OCCURRING IN GADCHIROLI FOREST DIVISION
A . TREES**

LOCAL NAME	BOTANICAL NAME	FAMILY
Achar	<i>Buchanania lanzan</i>	Anacardiaceae
Amaltas/Bahava	<i>Cassia fistula</i> , Linn	Caesalpiniaceae
Amta	<i>Bauhinia malabarica</i> , Roxb	Caesalpiniaceae
Anjan	<i>Hardwickia binata</i> , Roxb	Caesalpiniaceae
Apta	<i>Bauhinia racemosa</i> , Lamk	Caesalpiniaceae
Aonla	<i>Phyllanthus emblica</i>	Euphorbiaceae
Arjun	<i>Terminalia arjuna</i>	Combretaceae
Babul	<i>Acacia nilotica</i> Linn	Mimosaceae
Bud/Wad	<i>Ficus bengalensis</i> , Linn	Moraceae
Beheda	<i>Terminalia bellirica</i> , Gaertn	Combretaceae
Bel	<i>Aegle marmelos</i> (L)	Rutaceae
Bhirra	<i>Chloroxylon swietenia</i>	Rutaceae
Biba/Bhilwa	<i>Semecarpus anacardium</i> , Linn	Anacardiaceae
Bija	<i>Pterocarpus marsupium</i> , Roxb	Fabaceae
Bistendu	<i>Diospyros montana</i> , Roxb	Ebenaceae
Bor/Ber	<i>Zizyphus mauritiana</i> , Lamk	Rhamnaceae
Chichwa	<i>Albizia odoratissima</i> , Roxb	Fabaceae
Dhaman	<i>Grewia tilifolia</i> (vahl)	Tiliaceae
Dhaora	<i>Anogeissus latifolia</i> (R.Br.exDC)	Combretaceae
Dhoban/Satpuda	<i>Dalbergia paniculata</i> , Roxb	Fabaceae
Dikamali	<i>Gardenia resinifera</i> , Roth	Rubiaceae
Garari	<i>Cleistanthus collinus</i> , Roxb	Euphorbiaceae
Ghogar/papda	<i>Gardenia latifolia</i> Ait	Rubiaceae
Ghoti/Ghot	<i>Zizyphus glaberrima</i> (Sedgw)	Rhamnaceae
Gongal	<i>Cochlospermum religiosum</i>	Cachlospermaceae
Haldu	<i>Adina cordifolia</i> Roxb	Rubiaceae
Hingan	<i>Balanites aegyptica</i> (L) Del	Balanitaceae
Hiwar	<i>Acacia leucophloea</i> Roxb Willd	Mimosaceae
Hirda/Harra	<i>Terminalia chebula</i> Getz	Combretaceae
Imli/Chinch	<i>Tamarindus indica</i>	Caesalpiniaceae
Jambhul/Jamaun	<i>Syzygium cumini</i> Linn	Myrtaceae
Kakad	<i>Garuga pinnata</i> Roxb	Burseraceae
Kala-umber	<i>Ficus hispida</i>	Moraceae
Kakai	<i>Flacourtia indica</i> (Burm.f)	Flacoutiaceae
Kamala	<i>Mallotus philippensis</i>	Euphorbiaceae
Karai	<i>Millettia velutina</i> H.F. & Thoms	Anonaceae
Kalam	<i>Mitragyna parviflora</i> Roxb	Rubiaceae
Karanj	<i>Pongamia pinnata</i> (L) pierre	Fabaceae
Kateyen/Kasai	<i>Bridelia retusa</i> spreng	Euphorbiaceae
Kawith	<i>Limonia acidissima</i> Lorr	Rutaceae
Khair	<i>Acacia catechu</i> willd	Mimosaceae
Khirni	<i>Manilcora hexandra</i> Roxb	Sapotaceae

Kullu	<i>Sterculia urens Roxb</i>	Sterculiaceae
Kumbhi	<i>Careya arborea Roxb</i>	Lecythidiaceae
Kusum	<i>Schleichera oleosa Lour Merr</i>	Sapotaceae
Lasora/Bhokar	<i>Cordia dichotoma Forst.f.</i>	Boraginaceae
Lendia/sehna	<i>Lagerstroemia parviflora Roxb</i>	Lythraceae
Lokhandi	<i>Ixora arborea Roxb</i>	Rubiaceae
Maida-Lakri	<i>Litsea glutinosa</i>	Lauraceae
Medshing	<i>Dolichandrone falcata Seem</i>	Bignoniaceae
Moha/Mahuwa	<i>Madhuca longifolia Koen</i>	Sapotaceae
Mokha	<i>Schrebera swietenoides</i>	Aristolochiaceae
Moyen/mowai	<i>Lannea coromandelica Hoult</i>	Anacardiaceae
Neem	<i>Azadirachta indica A.Juss</i>	Meliaceae
Padar	<i>Stereospermum suaveolens DC</i>	Bignoniaceae
Pair	<i>Ficus rumphii</i>	Moraceae
Palas	<i>Butea monosperma Lamk Tau</i>	Fabaceae
Pangara	<i>Erythrina variegata Linn</i>	Fabaceae
Papra	<i>Holoptelia integrifolia</i>	Fabaceae
Rankela	<i>Dillenia pentagyna</i>	Magnoliaceae
Rohan	<i>Soymida febrifuga(A.Juss)</i>	Meliaceae
Sagwan	<i>Tectona grandis Linn</i>	Verbenaceae
Saja/ain	<i>Terminalia alata Heyne</i>	Combretaceae
Salai	<i>Boswellia serrata Roxb</i>	Burseraceae
Semal	<i>Bombax ceiba L</i>	Bombaceae
Shisham	<i>Dalbergia latifolia Roxb</i>	Fabaceae
Shivan	<i>Gmelina arborea Linn</i>	Verbenaceae
Siras-black	<i>Albizia lebbek L.willd</i>	Mimosaceae
Siras-white	<i>Albizia procera Roxb</i>	Mimosaceae
Sitaphal	<i>Annona squamosa L.</i>	Annonaceae
Suriya	<i>Xylia xylocarpa Roxb</i>	Annonaceae
Tendu	<i>Diospyros melanoxylon Roxb</i>	Ebenaceae
Tiwas/Tinsa	<i>Ougenia oojenensis Roxb</i>	Fbaceae
Umbar/Gular	<i>Ficus recemosa Linn</i>	Moreaceae
Warang/Baranga	<i>Kydia calycina Roxb</i>	Malvaceae

B. SHRUBS AND HERBS

LOCAL NAME	BOTANICAL NAME	FAMILY
Aal	<i>Moringa citrifolia(Lin)</i>	Celastraceae
Aghada	<i>Achyranthus aspera(Linn)</i>	Amartaceae
Akola	<i>Alangium salvifolium(Thwaites)</i>	Cornaceae
Ban rahar	<i>Flemingia semialata(Roxb)</i>	Fabaceae
Baibirang	<i>Embelia ribes</i>	Myrsinaceae
Bankapas/Rankapas	<i>Thespesia lamps</i>	Malvaceae
Bharati	<i>Maytenus emarginata(Benth)</i>	Celastraceae
Chind/Sindhi	<i>Phoenix sylvestris Roxb</i>	Palmae
Chipti	<i>Desmodium pulchellum Benth</i>	Fabaceae
Dhawai/Jilbili	<i>Woodfordia fruticosa Kurz</i>	Lythraceae
Dikamali	<i>Gardenia resinifera Roth</i>	Rubiaceae

Gurmukhi/Gursukri/ Gaturli	<i>Grewia hirsuta</i>	Tiliaceae
Gokhru	<i>Tribulus terrestris</i> , Linn	Zygoiphyllaceae
Harsingar/Kharsui	<i>Nyctanthus arbortristis</i>	Oleaceae
Jine	<i>Leea crispa</i>	Leeaceae
Ranbhendi	<i>Dodonea viscosa</i>	Spindaceae
Koril	<i>Petalidium barlerioides nees</i>	Acanthaceae
Kasterua	<i>Hygrophila auriculata k. Schum</i>	Acanthaceae
Kharoti	<i>Grewia hirsuta vahl.</i>	Tilianaceae
Kudursi	<i>Bridelia hamiltoniana wall</i>	Euphorbiaceae
Kudmudi	<i>Gardenia gummiifera Linn</i>	Rubiaceae
Kuda	<i>Holarrhena pubescens</i> (Buch, Ham)	Apocynaceae
Kala kuda	<i>Wrightia tinctoria</i>	Apocynaceae
Kuchala	<i>Strychnos nuxvomica</i>	Strychnaceae
Lokhandi	<i>Ixora arborea Roxb</i>	Rubiaceae
Morarphal	<i>Helictres isora Linn</i>	Sterculiaceae
Maruadona	<i>Carvia callosa Ness</i>	Acanthaceae
Nirmali	<i>Strychnos potatorum</i>	strychnaceae
Neel	<i>Indigofera tinctoria</i>	Papilionaceae
Phetra-safed	<i>Gardenia turgida Roxb</i>	Rubiaceae
Phetra-kala	<i>Tamilnadia uliginosa(Retz)</i>	Rubiaceae
Tarwad	<i>Cassia auriculata</i>	Caesalipiniaceae
Tarota	<i>Cassia tora Linn</i>	Caesalipiniaceae
Thuar	<i>Euphorbia tirucalli Linn</i>	Euphorbiaceae
Warangal	<i>Celastrus paniculata Willd</i>	Celastraceae

C. GRASSES AND BAMBOOS

LOCAL NAME	BOTANICAL NAME	FAMILY
Ghonad	<i>Themeda triandra</i>	
Bamboo-karka	<i>Dendrocalamus strictus(Roxb)</i>	Gramineae
Bamboo-katang	<i>Bambusa arundinacea(willd)</i>	do
Bhurbhusi	<i>Eragrostis tenella(Roem & Schulf)</i>	do
Godhel	<i>Eragrostis interapta</i>	do
Katanbahari	<i>Aristida funiculata(Trin. et. Rupa)</i>	do
Kunda/sum	<i>Eulaliopsis binata(Retz.)(Mark)</i>	do
Kusal/Speargrass/ Diwartan	<i>Heteropogon contortus(Linn)Beau</i>	do
Marvel-small	<i>Dicanthium annulatum(Forsek) Staff</i>	do
Marvel-big	<i>Dicanthium aristatum(poir)</i>	do
Mushan	<i>Iseilema laxum (Hack)</i>	do
Paonya	<i>Sehima sulcatum (Hack)Acamus</i>	do
Sheda	<i>Sehima nervosum (Staff)</i>	do
Tikhadi	<i>Cymbopogon martinii(Roxb)Watson</i>	do
Ukari	<i>Iseilema prostratum Anderss</i>	do
Chir	<i>Imperata officinalis</i>	do

D. CLIMBERS

LOCAL NAME	BOTANICAL NAME	FAMILY
Bandke	<i>Dendrophoe falcata</i> (Linn)	Loranthaceae
Chilar	<i>Caesalpinia decapetala</i> (Roxb)	Caesalpiniaceae
Chilati	<i>Mimosa hamata</i> (Willd)	Mimosaceae
Chilati badi	<i>Acacia torta</i> (W & A)	Mimosaceae
Dhimarval	<i>Celastrus paniculata</i> (Willd)	Celastraceae
Dudhi/Nagvel	<i>Cryptolepis buchanani</i> (Roem)	Periplaceae
Eroni	<i>Zizyphus oenopia</i> (Linn)	Rhamnaceae
Gunj	<i>Abrus precatorius</i> (Linn)	Fabaceae
Gulvel	<i>Tinospora cordifolia</i> (Willd)	Menispermaceae
Gurar,Nasvel	<i>Millotia extensa</i> (Baker)	Papilionaceae
Kajkuri	<i>Mucuna pruriens</i> (L)	Fabaceae
Khadyanag	<i>Gloriosa superba</i>	Liliaceae
Khobarvel	<i>Hemidesmus indicus</i> (Linn)	Periplieonaceae
Kukuranji	<i>Calycopteris floribunda</i>	Combretaceae
Mahulvel	<i>Bauhinia vahlii</i> (Wand A)	Caesalpiniaceae
Musalikand	<i>Dioscorea pentaphylla</i> (Linn)	Dioscoraceae
Papri,Lalvel	<i>Ventilago denticulata</i> (Willd)	Rhamnaceae
Palasvel	<i>Butea superba</i> (Roxb)	Fabaceae
Piwarvel	<i>Combretum ovalifolium</i> (Roxb)	Combretaceae
Ramdaton	<i>Smilax macrophylla</i> (Roxb)	Liliaceae
Shataori	<i>Asparagus recemosus</i>	do

E . PARASITES

Amaraval *Cuscuta reflexa*(Roxb) Cuscutaceae

F . EPIPHYTES

Vanda *Vanda cesellata*(Roxb) Orchidaceae

G . ENDEMIC/THREATENED PLANT SPECIES

Alichettu *Eonymus godaverensis* Celastraceae

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**COMMON AND ZOOLOGICAL NAMES OF THE ANIMALS AND BIRDS
COMMONLY FOUND IN GADCHIROLI FOREST DIVISION.**

A . ANIMALS

COMMON NAME	SCIENTIFIC NAME
Tiger	<i>Panthera tigris</i>
Panther	<i>Panthera pardus</i>
Hyaena	<i>Hyaena hyaena</i>
Wild dog	<i>Cuon alpinus</i>
Wolf	<i>Canis lupus</i>
Jackal	<i>Canis aureus</i>
Fox	<i>Vulpes bengalensis</i>
Jungle cat	<i>Felis chaus</i>
Bison	<i>Bos gaurus</i>
Sambar	<i>Cervus unicolor</i>
Chital	<i>Axis axis</i>
Nilgai	<i>Boselaphus tragocamelus</i>
Wild boar	<i>Sus cristatus</i>
Sloth bear	<i>Melursus ursinus</i>
Barking deer	<i>Muntiacus muntjak</i>
Common Langur	<i>Presbytis entellus</i>
Flying squirrel	<i>Petaurista petaurista</i>
Porcupine	<i>Hystrix indica</i>
Hare	<i>Lepus ruficaudatus</i>

B . BIRDS.

COMMON NAME	SCIENTIFIC NAME
Painted sandgrouse	<i>Pterocles indicus</i>
Common sandgrouse	<i>Pterocles exustus</i>
Pea fowl	<i>Pavo cristatus</i>
Grey jungle fowl	<i>Gallus sonneratii</i>
Painted Partridge	<i>Francolinus pictus</i>
Grey partridge	<i>Francolinus pondicerianus</i>
Blackbreasted quail	<i>Coturnix coromandelicus</i>
Red spour fowl	<i>Galloperdix spadicea</i>
Crane	<i>Grus antigone</i>
Spotted bill duck	<i>Anas poecillorhyncha</i>
Pigeon	<i>Treron phoenicoptera</i>
Dove	<i>Streptopelia spp.</i>
Cotton teal	<i>Nettapus coromandelienus</i>
Whistling teal	<i>Dendrocygna javanica</i>

C . ENDANGERED WILDLIFE

Animals		Birds	
1	Bison	1	Pea Fowl
2	Wolf		
3	Panther		
4	Sloth Bear		
5	Tiger		

RED LISTED MEDICINAL PLANTS OF MAHARASHTRA

Botanical Name	Family	Marathi Name
Adenia hondala	Passifloraceae	
Aegle marmelos	Rutaceae	Baela, Bili, Vel
Amorphophallus paeoniifolius		
Aphanamixis polystachya	Meliaceae	
Aristolochia bracteata	Aristolochiaceae	
Aristolochia tagala	Aristolochiaceae	
Baliospermum montanum	Euphorbiaceae	
Canarium strictum		
Celastrus paniculatus	Celastraceae	
Chonemorpha fragrans	Apocynaceae	
Chlorophytum borivillianum		
Cinnamomum macrocarpum	Lauraceae	
Drosera indica	Droseraceae	
Drosera peltata	Droseraceae	
Embelia ribes	Myrsinaceae	Karkannie, avadinga, Waiwarang
Garcinia indica	Clusiaceae	Amsole, Bhirand, Chirand, Katambi, Kokam, Ratamba
Garcinia gummi-gutta	Clusiaceae	
Garcinia morella	Clusiaceae	
Gardenia resinifera	Rubiaceae	Dikamali
Gloriosa superba	Liliaceae	Bachnag, Indai, Kallavi, Karianag, Khadyanag, Nagakaria
Gymnema khandalense	Asclepiadaceae	
Gymnema sylvestres	Asclepiadaceae	Bedaki, Bedakuli, Kalikardori, Kaoli, Kaveli, Madphali, Parpatracha, Vakhande, Vakundi
Hedychium coronarium	Zingiberaceae	
Kaempferia galanga		
Lamprachaenium microcephalum	Asteraceae	Bramhadandi
Lobelia nicotianaefolia	Lobeliaceae	Devanala, Dhavala, Nala, Thoradevanala
Mappia foetida	Icacinaceae	
Madhuca longifolia	Sapotaceae	
Mesua ferrea	Clusiaceae	Nagchampa, Nagchampe, Nag-champa, Sonchampa
Moringa concanensis	Moringaceae	Muwa, Ranshegat, Sajana
Myristica dactyloides	Myristicaceae	
Nervilia aragoana	Orchidaceae	
Nervilia prainiana	Orchidaceae	
Oroxylum indicum	Bignoniaceae	Kharsinga, Taitu, Tetu, Titu, Ulu
Operculina turpethum	Convolvulaceae	Nishottara

Persea macrantha	Lauraceae	
Piper nigrum	Piperaceae	Kalimiri, Kalimirch, Mire
Pseudarthria vicida	Papilioniaceae	
Pueraria tuberosa	Papilioniaceae	Badra, Bhadra, Pithana
Rauvolfia serpentina	Apocynaceae	Hadki, Harkaya, Harki, Mungusavel, Sapasanda
Salacia oblonga	Celastraceae	
Santalum album	Santalaceae	Chandan, Gandhachakoda, Safed-chandan
Saraca asoca	Caesalpiniaceae	
Symplocos cochinchinensis	Symplocaceae	
Symplocos racemosa	Symplocaceae	Lodh, Lodhra
Terminalia arjuna	Combretaceae	Anjan, Arjun, Arjuna, Arjundanda, Azun, Kahu, Sadura, Sanmadat, Savimadat, Shardul.
Viola odorata	Violaceae	Bagabanosa

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List of Medicinal Plants in Gadchiroli Forest Division

Sl. No.	MPCA Code No	Species	Familly	Med. Sysm	Marathi Name
1	2	<i>Acacia catechu</i>	Mimosaceae	AFTUS	Kaderi, khair, khaderi, khaira, lal khair.
2	5	<i>Acacia leucophloea</i>	Mimosaceae	AFS	Hewar, Hiwar, pandhri babul, pan hariya
3	9	<i>Acacia torta</i>	Mimosaceae	F	
4	19	<i>Aegle marmelos</i>	Rutaceae	AFHVTUS	Bael, Billi, Vel.
5	31	<i>Albizia odoratissima</i>	Mimosaceae	AFVUS	Chichwa, RamSaras.
6	42	<i>Alysicarpus tetragonolobus</i>	Fabaceae	F	
7	47	<i>Ampelocissus latifolia</i>	Vitaceae	AFV	Nadena
8	50	<i>Andrographis paniculata</i>	Acanthaceae	AFHVUSM	Olenkirayat
9	53	<i>Anogeissus latifolia</i>	Combrataceae	AFTUS	Daura, Dawnra, Dhamora, Dhaora, Dhauda, Dhavda
10	60	<i>Asparagus racemosus</i>	Liliaceae	AFVTUS	Asvel, Sahannsarmoli, Salvari, Satavarimull, Satavarimul, Shatavar, Shatamuli, Zatar.
11	63	<i>Atylosia platycarpa</i>	Fabaceae	F	
12	64	<i>Atylosia scarabeoides</i>	Fabaceae	F	
13	74	<i>Bauhinia racemose</i>	Caesalpiniaceae	AUS	Apata, Apta, Karanja, Seyara, Shiara, Sonan, Vanraja.
14	76	<i>Biophytum candolleanum</i>	Oxalidaceae	AV	
15	77	<i>Biophytum reinwartii</i>	Oxalidaceae	AU	
16	81	<i>Bombax ceiba</i>	Bombacaceae	AVUSF	KantaSair, Kanterisamar, Kantesavar, Samar, Saur, Savar, Savari, Sayar, Semal, Shevari, Simlo, Tamari.
17	83	<i>Borreria articularis</i>	Rubiaceae	F	
18	84	<i>Boswellia serrata</i>	Burseraceae	AFTUS	
19	87	<i>Bridelia retusa</i>	Euphorbiaceae	A FU	Asan, Asana, Asana-kutgi, Ssna, Gunjan, Kantakauchi, Katiain, Kutki, Palapasana.
20	89	<i>Buchanania lanzan</i>	Anacardiaceae	ATUSF	Char, Charoli, Chirauli, Chironji, Pyalchar
21	90	<i>Butea monosperma</i>	Fabaceae	AFTUS	Kakracha, Palas, Paras, Phalas, Phulas
22	91	<i>Butea superba</i>	Fabaceae	AFS	Beltivas, Palasavela, Palasvel, Yelparas
23	98	<i>Calycopteris floribunda</i>	Combrataceae	AFU	Baguli, Boguli, Ukshi, Wukshi
24	100	<i>Canscora diffusa</i>	Gentianaceae	A	Titavi, Yavotchi.
25	119	<i>Cassia fistula</i>	Caesalpiniaceae	AFVTUS	Bahava, Bawa, Bhawabaya, Bhawan, Boya, Chimkani, Garmala, Girimala, Gurmala
26	121	<i>Cassia pumila</i>	Caesalpiniaceae	F	Sarmal
27	126	<i>Celastrus paniculatus</i>	Celastraceae	AFTUS	
28	129	<i>Ceriscoides turgida</i>	Rubiaceae	A	
29	141	<i>Cleistanthus collinus</i>	Euphorbiaceae	AS	Garari
30	160	<i>Costus speciosus</i>	Costaceae	AFVUS	Penva, Pinnga, Pushkarmula
31	171	<i>Curculigo orchiodes</i>	Hypoxidaceae	AFTUS	Bhuyimaddia, Kalimusli.

32	182	<i>Dendrocalamus strictus</i>	Poaceae	AFS	
33	184	<i>Desmodium gangeticum</i>	Fabaceae	AFHT , US	Darh, Ranbhal, Salvan , Sawan, Salpami.
34	187	<i>Desmodium triflorum</i>	Fabaceae	AFUIS	Chipti, Ranmethi, Ranmeti.
35	188	<i>Desmodium velutinum</i>	Fabaceae	AS	
36	193	<i>Dioscorea bulbifera</i>	Dioscoreaceae	AFVTUS	Dukaraknda, Gathalu, Konfagoradu
37	199	<i>Diospyros ebenum</i>	Ebenaceae	FSU	Abnus, Tai, Tendu.
38	205	<i>Dolichandrone falcata</i>	Bignoniaceae	AFTS	Bhersing, Medasingi, Med.shing, Mersunghi, Mersingi
39	215	<i>Elephantopus scaber</i>	Astraceae	AFVUS	Pathari.
40	218	<i>Embllica officinalis</i>	Euphorbiaceae	AFTUS	Aouli, Avalkti, Avla, Awla.
41	219	<i>Emilia sonchifolia</i>	Asteraceae	AFVUS	
42	230	<i>Evolvulus alsonoides</i>	Convolvulaceae	AFTUS	Shankavall, Shankhavalli, Vishnukanta, Vishnukrantha.
43	235	<i>Ficus amplissima</i>	Moraceae	AV	
44	242	<i>Ficus religiosa</i>	Moraceae	AFHVTUS	Ashvath, Ashvatha, Pimpala, Pipal.
45	244	<i>Flacourtia indica</i>	Flacourtiaceae	ATUSF	Bhekal, Binka, Kaker, Kuki, Paker, Tambat.
46	250	<i>Gardenia latifolia</i>	Rubiaceae	AS	Ghogar, Papura
47	251	<i>Gardenia resinifera</i>	Rubiaceae	AUS	Dikamali,
48	255	<i>Gloriosa superba</i>	Liliaceae	ATUSF	Bachnag, indai, Kllavi, Krianag, Khadyanag, Nagakria
49	265	<i>Grewia salvifolia</i>	Tiliaceae	S	
50	266	<i>Grewia tiliaefolia</i>	Tiliaceae	AFS	Daman, Damni, Dhaman, Karavarani, Karkarani
51	276	<i>Hemidesmus indicus</i>	Asclepiadaceae	AFVTU	Anantanmul, Anantvel, Dudhasali, Lahankavali, Makur, Upalasari, Uparasal, Upersari.
52	284	<i>Holarrhena antidysenterica</i>	Apocynaceae	AFHT , US	Bedaki, Kodaga, Kuda, Kurra, Pandharkuda, Pandharkura
53	289	<i>Hybanthus enneaspermus</i>	Violaceae	AFVS	
54	294	<i>Hyptis suaveolens</i>	Lamiaceae	AF	
55	305	<i>Ixora arborea</i>	Rubiaceae	AF	Kura, Kurat, Lokhandi
56	321	<i>Lagerstroemia parviflora</i>	Lythraceae	AS	Bondara, Bondga, Lende
57	322	<i>Lannea coromandelica</i>	Anacardiaceae	AFVU	Magir, Moya, Shemat, Shinti.
58	329	<i>Lepidagathis cristata</i>	Acanthaceae	FS	Bhuyaterada
59	335	<i>Lindemia ciliata</i>	Scophulariaceae	V	
60	346	<i>Maytenus emarginata</i>	Celastraceae	FV	
61	358	<i>Mitragyna parvifolia</i>	Rubiaceae	A FUS	Kadamb, Kalam, Kalan
62	367	<i>Murdannia nudiflora</i>	Commelinaceae	V	
63	387	<i>Phoenix sylvestris</i>	Arecaceae	AFVT, US	Boichand, Sendri, Sindi, Sindikajuri.
64	393	<i>Phyllanthus virgatus</i>	Euphorbiaceae	V	
65	394	<i>Physalis minima</i>	Solanaceae	AFTUS	Chirboti, Dhanmori, Kapparpodi, Lahan-popti, Phopeti, Tanmori
66	418	<i>Randia spinosa</i>	Rubiaceae	AF	Gehela, Gel, Ger, Mainhpur.
67	419	<i>Randia uliginosa</i>	Rubiaceae	AFUS	Cindra, Klaphendra, Pandhri, Pendhara, Pendrey, Pendru, Pindra, Penedra, Phetra, Telphetru, Tupkela.
68	422	<i>Rhynchostylis retusa</i>	Orchidaceae	V	

69	435	<i>Schleichera oleosa</i>	Schizandraceae	AFS	
70	436	<i>Schrebera swietenoides</i>	Oleaceae	AFTS	Moka, Mokadi, Nakti.
71	439	<i>Semecarpus anacardium</i>	Anacardiaceae	AFH TUS	Bibba, Bibha, Bibu, Bibua, Bibwa.
72	442	<i>Sida acuta</i>	Malvaceae	AFVUS	Bala, Chikana, Pata, Tukati, Tupkaria
73	444	<i>Sida cordifolia</i>	Malvaceae	AFVTUS	Bala, Chikana, Khiranti, Tupkaria
74	445	<i>Sida rhombifolia</i>	Malvaceae	AFVTUS	
75	451	<i>Swietenia febrifuga</i>	Meliaceae	A	
76	456	<i>Stereospermum personatum</i>	Bignoniaceae	FS	
77	457	<i>Stereospermum suaveolens</i>	Bignoniaceae	AFTUS	Kalagori, Kalgari, Kalgori-padri, Padal, Padialu, Pahad, Parul, Patala, Patalo.
78	475	<i>Terminalia crenulata</i>	Combretaceae	AF	
79	484	<i>Tridax procumbens</i>	Asteraceae	AFS	
80	488	<i>Urena lobata</i>	Malvaceae	AFVS	Rantupkada, Rantupkuda, Vana-Bhenda, Vanabendha, Vanbhendi, Wagdau Bhendi.
81	490	<i>Vanda tessellata</i>	Orchidaceae	AFUS	Rasna
83	496	<i>Vigna unguiculata</i>	Papilionaceae	A FS	
84	504	<i>Woodfordia fruticosa</i>	Lythraceae	AFTUS	Dalyatti, Dhaiphal, Dhaiti, Dhauri, Dhayati, Dhazatichi, Phulsati, Phusati, Pulsathi.
85	509	<i>Xylia xylocarpa</i>	Mimosaceae	AF	
86	515	<i>Zizyphus oenoplia</i>	Rhamnaceae	AFS	Kanerballi.

** **Medi-** Medicinal System:- A-Ayurveda, F- Folk, H-Homeopathic, M-Medicinal, S-Siddha, T-Tibetan, U-Unani, V-Van Rheede, **Forest Types:-** Th-Thorn, Dr- Dry Deciduous, Mo-Moist deciduous, Se- Semi Evergreen, Hi- Broadleaved Hill. All these are tropical forests, except the last being subtropical.

CHAPTER – I

THE TRACT DEALT WITH

SECTION - 1: NAME AND SITUATION:

1.1.1 This working plan deals with the entire forest areas of Gadchiroli Forest Division, which was the part of the erstwhile East Chanda Forest Division. This division was carved out of East Chanda Forest Division in the year 1983. The total forest area of this division is 219411.49 Ha. Out of this 14247.80 Ha. is Reserved Forest A class, 2942.82 Ha. is Reserved Forest B class, 169727.31 Ha. is newly created Reserved Forests, 28170.20 Ha. is Protected Forests, 3441.14 Ha. is Un-notified forests and 882.22 Ha. is Zudpi Jungle. The forest areas of Gadchiroli Division are more or less in compact blocks situated in the middle of the Gadchiroli District and within the civil territories of Gadchiroli, Dhanora, Chamorshi (P), Kurkheda (P), and Armori (P) Tahsils. These areas lie between latitudes 19° 51' and 22° 31' North and longitudes 79° 55' and 80° 30' East.

1.1.2 This Working Plan replaces the working plan of B.P.Singh & Ashok Sharma. The total geographical area of the division is 3146.39 Sq.Km. The total forest area of the division included in this plan is 2194.11 Sq.Km., which is about 69.73% of the total geographical area of the division. The boundaries of the tract dealt with are as follows:

North	:	Wadsa Forest Division.
East	:	Sanjari Balod Tahsil of Durg District, Narainpur Tahsil of Bastar District of Chattisgarh State.
South	:	Ghot Range of Allapalli Forest Division and North Etapalli Range of Bhamragarh Dn.
West	:	Wainganga River and Chandrapur District.

SECTION- 2: CONFIGURATION OF THE GROUND:

1.2.1 Most of the areas, covered under this plan is undulating and hilly. The forests of Gadchiroli Division are situated on the triangles of high lands forming a tableland, which runs throughout the entire length of the western portion of the division. On this tableland, numerous hills rise on the northeastern, eastern and southeastern sides but there are no regular ranges. Two main blocks of hills lie in Palasgarh and Gewardha ex-zamindari and are known as sati nala hills. The name of satinala hills might have been derived from Sati River, which rises there and flows into Khobragadi River, a tributary to Wainganga River. The highest portion of satinala hills is known as kala pani and is 473 Mt. above MSL. There is another block of hills rising to the elevation of 660 Mt. above MSL known as Tipagarh range. On the top of the mountain range there is an old fortress of Tipagarh. Within this mountain range there is a reservoir of considerable size with a stone

embankment and steps along its water face. This reservoir is the source of Tipagarh River, which flows from the Western bank, and during rains it becomes a roaring mountain torrent.

SECTION- 3: DRAINAGE:

1.3.1 The Wainganga river, which forms the western boundary of the division, is the main recipient of numerous tributaries. The entire area of the division falls on the left bank of the river and is drained through major tributaries such as Garhvi, Khobragadi and Kathani rivers.

SECTION- 4: GEOLOGY, ROCK AND SOIL:

1.4.1 ROCKS:

The tract dealt with is in the eastern side of the Wainganga river, having geological formation belonging to the Archaean series. The successions of formations as noticed in this tract are given in the following table.

Table No. – 4

S.N.	Origin	Geological formation	Rocks
1	Recent	Alluvium	Alluvium, Soil, Laterite
2	Upper Gondwanas	Maleri beds Chikiala beds	Sandstones, Shales, Clay Sandstones.
3	Lower Gondwanas	Kamti Series	Sandstones and shales
4	Upper Cuddapah	Pakhal series	Conglomerates, silicious limestones, slates
5	Archaeans	Crystalline metamorphic series	Gneisses, granites, schists.

1.4.2 ARCHEAN SERIES:

The most predominant rock formations are Granites and Granite gneisses. These rocks are uniform in texture and composition. They are composed of feldspar, quartz and hornblende with varying portions of biotite. The granites become fine grained towards North. The portion of feldspar in these rocks varies from place to place and influences the colour of the rock. Potash feldspar predominates over Soda feldspar and Opaque ore and Spatite occur as accessories. These rocks give rise to arenaceous loamy soils. Most of the area has granite or gneiss as bedrock.

1.4.3 The Laterite, which covers most of the rock units, displaces vesicular and tubular structure, the inner surfaces of which are stained by a dull brown limonitic coating. When fresh, the rock is soft and bright but turns hard and dull brown on exposure to atmosphere. Its thickness varies generally from 1 to 2 m and rarely from 3 to 5 m. The Laterite gives rise to reddish brown soil.

1.4.4 The soil mantle covering all the rock units varies in thickness from 2 to 6 m. except in some areas, where there is a greater thickness of soil mantle.

1.4.5 MINERALS:

Feldspar, mica, quartz and limestone are common minerals found in the tract.

1.4.6 SOIL:

Soil derived from the Archaeans deposits is of moderate depth. It is black clayey, overlying soft gray Murum with sand.

1.4.7 Soil derived from cuddapah is clay loam and very fertile and deep. Soil derived from upper Gondwana types is sandy and soft. The area bears good quality miscellaneous forests. Soil is fragile and easily eroded. Lower Gondwanas support deep and fertile soil, which bears high quality miscellaneous forests and in well-drained patches, it supports teak.

1.4.8 Alluvial soil near riverbeds supports high quality forest and Katang bamboo. Red soil derived from metamorphic rocks is poor, thin and gravel. Soil being ancient in origin, these have undergone repeated secondary modifications by addition of some constituents.

1.4.9 Regur or black cotton soil patches are intervening in the middle portion of this tract. This fine-grained dark soil, which varies greatly in colour, consistency and fertility. It is highly argillaceous and becomes adhesive when wet. It is chemically rich and indicates high alkalinity at places. Kankar formations are also seen.

1.4.10 Sandy loamy soil is abundant in the area, often in the lower crust. It supports teak profusely.

1.4.11 LATERITE SOIL:

This soil is fairly common in the area and it does not support teak profusely, due to moisture.

SECTION - 5: CLIMATE:

1.5.1 Climate of this area remains hot and dry for major period of the year. It is characterized by a hot summer, almost well distributed rainfall during the southwest monsoon season and general dryness except in the rainy season.

1.5.2 SEASONS:

There are three distinct climatic seasons. They are the summer, winter and rainy seasons.

1.5.3 (i) SUMMER SEASON:

Summer starts from mid of February and continues up to onset of monsoon in mid of June. With the beginning of summer there is definite rise in day and night temperatures. The temperature remains very high till the break of

monsoon. Generally May is the hottest month of the season. Hot winds blow from early April and continuous till the onset of monsoon. The maximum temperature reaches up to 48° C. Occasionally cyclonic rains are received during March and April months. The statistics of temperature are given in **Appendix –II of Volume II.**

1.5.4 (ii) RAINY SEASON:

The southwest monsoon is the chief source of rains in this tract. The rainy season starts from middle of June and extends up to the end of September and some times up to early October. With the onset of monsoon the temperature decreases appreciably and the weather becomes pleasant. The monsoon months are sultry. The average rainfall in this tract is 1976 mm. The highest intensity of rainfall is in the month of July. However, cyclonic rains are received during the remaining part of the year. In the recent past there has been erratic rain during the monsoon almost every alternate year. Erratic rains affect the natural regeneration and plantations. The maximum, minimum annual rainfalls are given in the **Appendix –III of Volume II.**

1.5.5 (iv) WINTER SEASON:

It starts from November and ends in the middle of February. The winter is moderately cool and pleasant. The mean maximum temperature in cold season is 33.18° C. and the mean minimum temperature is about 14.66 C. Lowest temperature recorded is 7° C. Frost is unknown in this tract.

1.5.6 HUMIDITY:

During monsoon season the humidity exceeds 70% and in summer the relative humidity is between 20 to 25 %. The relative humidity is maximum in the month of August and September and then it gradually decreases till April and again increases in June.

HEALTH CONDITION:

Due to the climatic conditions, the tract is very unhealthy. There is improvement in health services due to the formation new tahsils having Rural hospitals/Primary health centers/Sub centers with adequate buildings, equipments & medicines. However, doctors and other staff are not willing to work in the district because of naxalites problem and remoteness of the area. The epidemics are rare. People often suffer from diarrhoea, dysentery and malaria in remote villages during monsoon and post monsoon seasons due to contamination of drinking water. Incidents of malaria are increasing every year. Respiratory and skin diseases are also common. Malnutrition is reported in some parts of the area due to unawareness and poverty of the people.

SECTION- 6: WATER SUPPLY:

1.6.1. A number of tanks, wells, rivers and perennial nalas form the major source of water supply. In the absence of dams, most of the rainwater drains off in to the rivers leading to drying of majority of the nalas and tributaries.

1.6.2 In the interior areas there are a few springs and a number of perennial streams, which form the natural source of water. The nalas on the higher sides on getting down to the plain contained scattered pools of permanent water which form the most important sources of water supply for grazing cattle during the hot season.

1.6.3 During summer, water table goes down hence wells and tanks dry up and there is an acute scarcity of water. During this period the people meet their drinking water requirement either from the perennial wells or by digging few feet water hole known as “Jhara” in the nala or riverbeds. The perennial wells also have insufficient water during summer. In the interior areas the people mostly depend on Jhara during summer. Deepening of the existing wells, digging of new wells, tube wells, borewells, hand pumps etc. on large scale during recent past have improved the condition to some extent. In the years of low rainfall, acute shortage of drinking water is felt in many villages and water is supplied by tankers and bullock carts to scarcity areas.

1.6.4 In summer, wildlife also suffers and it has to depend on very few limited sources like natural springs, small-stagnant pools in some nalas and Jharas. The number of these sources decreases in latter part of the summer. Large number of small, temporary Jharas are dug by locals for drinking water.

SECTION-7: DISTRIBUTION OF AREAS:

1.7.1 Total forest area of the division is 219411.49 and it is distributed over nine ranges of this division. The range wise distribution of forest area is as follows.

Table No. - 5

RANGE WISE DISTRIBUTION OF FOREST AREAS

S N	Name of the Range	Reserved Forests (in ha)			Protected Forests (in ha)	Un - Notified Areas (in ha)	Zudpi Jungle Area (in ha.)	Grand Total (in ha)
		A-Class Reserved Forests	B-Class Reserved Forests	New Reserved Forests				
1	Kunghada	--	554.12	20349.28	3665.03	110.08	--	24678.51
2	Potegaon	--	--	17401.55	2491.74	427.86	66.90	20388.05
3	Gadchiroli	9302.92	1697.49	8810.81	2637.16	70.23	130.46	22649.07
4	Chatgaon	3752.67	454.47	16293.93	4792.23	66.80	207.80	25567.90
5	Pendhari	--	--	31552.92	3245.72	80.98	--	34879.62
6	Dhanora North	1192.21	236.74	15450.53	3819.02	1508.91	161.73	22369.14
7	Dhanora South	--	--	20168.69	3480.53	888.20	251.14	24788.56
8	Murumgaon East	--	--	20148.25	2376.07	17.09	12.67	22553.78
9	Murumgaon West	--	--	19551.35	1662.70	270.99	51.82	21536.86
	Total	14247.80	2942.82	169727.31	28170.20	3441.14	882.22	219411.49

SECTION- 8: STATE OF BOUNDARIES:.

1.8.1 The area of Reserved Forests is 186917.93 Ha. or 85.19% area of the forest cover under this working plan. Total length of external boundary of the forests is 161.80 km., out of which 21.00 km is having permanent natural features. Artificial boundaries are cleared to a width of 12 meter with pillar/cairns at suitable intervals. The pillars consist of a central wooden stake of durable timber with pyramidal top surrounded by a cairn of stone or earth. They are numbered serially anti-clockwise and each village boundary is having separate series of numbers. The state of maintenance of boundary lines is very poor. In most of the places pillars are not in existence. In the newly formed Reserved Forests there is no boundary lines at all. In B-class Reserved Forests, the boundaries do not exist at most of the places making it difficult to locate them on the ground. Because of the absence of permanent boundary lines, the forestlands are more prone to encroachments in many areas.

1.8.2. The boundaries of protected forests are also not maintained properly and the position of the Cairns is not shown on the map. The boundaries of the forest in un-surveyed villages are not maintained.

SECTION-9: LEGAL POSITION:

1.9.1.RESERVED FORESTS:

The forests dealt with under this plan were notified as reserved forests under Indian Forest Act (VII of 1878) under the Central Provinces' Gazette Notification No. 917(i), dt. 24th February 1879, and No. 3918, dt. 5th September 1895, and Govt. of Maharashtra, Revenue and Forest Department Notification No. FLD/3685/9316/CR-42/F-3, dated 5/5/1992.

1.9.2. PROTECTED FORESTS:

As per the section-3 of Madhya Pradesh Abolition of Proprietary Rights (Estate, Mahals & Alienated Lands) Act, 1950 areas belonging to malgujars became the property of State Government. These forests were transferred from time to time to the Forest Department as per the instructions contained in Madhya Pradesh Govt. Revenue department No. 2249/286-XII, dated 6th April 1951 and No.7177/CR-617-12 of 4th December 1951 with an object of managing the forests on scientific lines. Subsequently these forests were declared as Protected forests under section 29 of I.F.A., 1927, Notified vide M. P. Gazette Notification No.3056-1216-XI, dated 4th June 1955 and Bombay Gazette Notification No.FLD/1056-12623-F, dated 8th August 1957 published on 3rd October 1957. Further the Govt. of Bombay declared its decision to constitute these forests as reserved forests under sec. 4 of I.F.A. 1927 vide Bombay Govt. Gazette Notification No.FLD/1258/II-3314-E, dated 30th May 1959, which was published 20th August 1959.

1.9.3. The Forest Settlement Officer was appointed in Chandrapur District on 12th February 1960 for the purpose of settlement of rights and concessions in the forests covered under Gadchiroli and Sironcha Tahsils. The F.S.O. completed his enquiries regarding the settlement and submitted his final report with

recommendations to the Commissioner, Nagpur Division, vide his letter No. WS.FSO/1340/75 dated 13th September 1975. The Government of Maharashtra has approved the recommendations of the F.S.O. and the forests have been declared as reserved forests under Section 20 of the I.F.A.1927, vide Govt. of Maharashtra, Revenue and Forest Department Notification No.FLD-3685/9316/CR-42/F-3, dt. 5th May 1992. Vide this Notification the Government has declared 169727.31 Ha. Forest area as the Reserved Forest in the tract dealt with. These forests are commonly called as New Reserved Forests. Statement showing the abstract of forest area is given in the Appendix No. V and statement showing village wise and compartment wise reserved and protected areas are given in the Appendix No. VIII.

SECTION-10: RIGHTS AND CONCESSIONS:

1.10.1 RESERVED FORESTS:

The Reserved Forest areas coming under this Forest Division are not burdened with any rights & concessions. However grazing passes are given to the agriculturists of certain villages to graze their cattle in accordance with grazing rules issued vide Government Resolution No. MFP-1371/237035-Z, dated 3rd November, 1973. Agriculturists are also given certain nistar facilities such as firewood below 30 cmt. girth, poles, bamboos, fencing materials etc. for their bonafide use. The details of nistar supply are given in Appendix No. LXXV of volume II.

1.10.2 PROTECTED FORESTS:

Under the provisions of Madhya Pradesh Abolition of Proprietary Rights (Estates, Mahals, Alienated Lands) Act, 1951, all the community and other wastelands were brought under the ownership Government and occupied lands continued to be as private. In order to distinguish between the rights existing on the new Government wastelands and on other lands, a provision was made in the new Madhya Pradesh Land Revenue Code, 1957 prescribing the preparation of a Nistar Patrak and Wajib-ul-arz for every village. The Nistar Patrak deals exclusively with the management and use of Government forests Land while the Wajib-ul-arz deals with community rights and concessions of the user over private lands.

1.10.3 The nistar enquiry was conducted in old Gadchiroli tahsil during the period 1951-53 and almost all the villages were covered under it. The Nistar Officer formed grazing and nistar zones by clubbing together surplus villages with deficit villages while self-sufficient villages were treated as individual zones. Villages assigned to particular zone can exercise their nistar.

1.10.4 The classification of villages into surplus, deficit or self sufficient for exercise of nistar rights was made on the following basis.

- I. A village having tree clad area equal to half the occupied area was considered to be self-sufficient.

- II. A village having tree clad area more than half the occupied area was considered to be surplus village.
- III. A village having tree clad area less than half the occupied area was considered to be a deficit village.

1.10.5 GRAZING:

The basis for forming grazing zones was that each unit of cattle in cotton and jawar tract should have 1/2-acre area of grazing ground and that in other tracts it should have 1 acre.

1.10.6 The rules for grazing of agricultural cattle are as follows:

1.10.7 For Agricultural cattle grazing passes are issued on payment of fees. Agricultural cattle have been defined by the Nistar Officer as cattle required for any of the following purposes: -

- i) For agricultural operations like ploughing etc.
- ii) Cattle for milk, curds, ghee etc.(for domestic consumption).
- iii) Cattle used for bullock carts and transport. (For cultivator own use and not for hire etc.)
- iv) Cattle maintained to provide calves, etc. (For cultivators' own use).

1.10.8 As per the directives of the Government contained in Land Reforms Department, Ex-Madhya Pradesh Memorandum No.1290-1227-XXVIII, dated 4th September 1953, sheep and goats are not allowed to graze in the forests meant for production of big timber or in the forest areas where villagers generally exercise their nistar rights. Special areas are to be assigned for sheep grazing, which is to be identified by Dy. Conservator of Forest under section 116 of BFM Volume III.

1.10.9 OCCUPATIONAL NISTAR:

In nistar patraks, occupational rights of the Kumbhars, Chamars, Madias, Gonds, Mahars, Pradhan, Zariva and Lohar communities have been recorded and recognized in several villages.

1.10.10 The villagers, for bonafide domestic and agricultural purposes, require the nistar. Forest nistar generally includes timber of certain species for agricultural implements, construction of houses and cattle sheds, fire wood, bamboos, thatching and fodder grasses, fencing materials, bark, fiber, minor minerals and minor forest produces i.e. edible fruits, flowers and roots, honey, wax etc. The rights and concessions are governed as per the provisions made in the nistar patrak for each village, according to which, agriculturists and agricultural labourers are entitled to the forest produce for their nistar either free of charge or at concessional rates fixed by the Collector.

1.10.11 The Government of Maharashtra (Revenue & Forest Department) has laid down the grazing policy for Maharashtra State vide G.R.No.1365/1332211-Y dated 06.12.1968 and further declared grazing rules for the whole state under the G.R. No. MFP-1371/237035-Z dated 03.11.1973. Each Forest Division will be a grazing Division and it is divided into grazing units under the orders of Principal Chief Conservator of Forests, M.S. Nagpur. Grazing licenses shall be valid for the grazing unit only and it shall cover a period not exceeding one forest year. All licenses lapses by 30th June of each year. In exceptional circumstances the Dy. Conservator of Forests, may permit cattle for which passes have been taken for one grazing unit to graze in another on the same licenses without fresh fees. The details of the G.R.s issued by the Government from time to time are given in **Appendix –XLV of Volume II.**

1.10.12 In nistar patrak of each village, khasra numbers set aside for nistar are recorded. However, the details regarding quantum of nistar during which it is to be allowed, payment if any, to be made etc. are not given in the nistar patraks in general. Nistars are also regulated by Protected Forest Rules 1958 & laid down in various sections regarding restrain in removal of nistar material.

1.10.13 Nistar forest areas were dealt badly by the people in the past and therefore, the crop condition is bad especially near the human habitation. These forests suffered considerably due to over harvesting, excess grazing and repeated fires. If the appropriate measures for improvement of the crop are not taken, these forests will no longer be able to meet the nistar requirements of the people.

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CHAPTER - II

FLORA AND FAUNA

(A)- FOREST FLORA

SECTION - 1: COMPOSITION AND CONDITION OF THE CROP:

2.1.1. The forests of the tract dealt with belong to the Sub-group 5A Southern Tropical Dry Deciduous Forests, as per the revised classification of forest types of India by Sir Harry Champion and Shri S.K. Seth. Within the sub group 5A, considerable local variations occur and most of the forests of the tract dealt with belong to the type 5A/C3-Southern Dry Mixed Deciduous Forests. Considerable variations in floristic compositions are noticed due to edaphic and topographic factors.

2.1.2. The climatic conditions are almost identical and uniform throughout the area. As variations in altitude are not very significant, it does not influence the distribution of crops. The biotic factors have played the major role in influencing the composition and condition of the crop. The forests have been degraded because of excessive grazing, unregulated fellings and frequent fires. The felling is often concentrated on valuable species for various purposes. Seedlings are particularly exposed to the excessive grazing and fires. In the vicinity of the villages forests have been subjected to severe exploitation and mass encroachments, which have resulted in degraded scrub vegetation or blanks. The edaphic factors also influence the crop appreciably, affecting the type and quality of vegetation. The composition and quality of the crop varies appreciably depending upon the soil type, its depth and drainage. Well-drained deep loamy and alluvial soils bear better quality forests. The quality deteriorates where the soil is shallow or water logged.

2.1.3. The forests of this division are mostly mixed forests having a great variety of species. Teak occurs in small patches in varying proportions depending upon the soil, drainage and topography. It is however, totally absent in majority of the tract being dealt with. The upper canopy is uneven and not very dense, formed by a mixture of dry deciduous species. The lower canopy is almost deciduous although evergreen and sub-evergreen species are present. They are inconspicuous and mainly confined to the moist and more sheltered spots. Undergrowth is of shrubs, which permits enough light for the growth of grass. Canes and palms are absent. The main species of bamboo found is *Dendrocalamus strictus*. Epiphytes and ferns are quite inconspicuous.

2.1.4 One of the major reasons for the absence of teak in Gadchiroli division is due to the different geological formations and soil derived from it.

2.1.5 Considering all the factors mentioned above and the composition and condition of the crop for the purpose of description, Champion and Seth distinguished these forests in to the following revised types.

Table No.-6

S.N.	Group of Forest	Champion and Seth's classification
1	Group 5 Sub-group 5A	Tropical Dry Deciduous Forests, Southern Tropical Dry Deciduous Forest
2	I. Climax Types. (1) 5 A/C1 (2) 5A/C3	(1) Dry Teak Bearing Forests (2) Southern Dry Mixed Deciduous Forests
3	II. Degradation Stages. (1) 5/DS1	(1) Dry Deciduous Scrub
4	III. General Seral Types. (1) 5/1S1	(1) Dry Tropical Riverain Forests

SECTION – 2: GENERAL DESCRIPTION:

2.2.1. The following local types, which merge into one another, are distinguished for the purpose of describing the forests.

A. TEAK FORESTS WITH DENSE BAMBOO:

- a) Plain sub-type.
- b) Hill sub-type.

B. TEAK FORESTS WITH SCANTY OR NO BAMBOOS:

- a) Plain sub-type.
- b) Hill sub-type.

C. MIXED FORESTS WITH DENSE BAMBOOS:

D. MIXED FORESTS WITH SCANTY OR NO BAMBOOS:

A. TEAK FORESTS WITH DENSE BAMBOO:

2.2.2. TEAK FORESTS WITH DENSE BAMBOO:

a) Plain Sub Type:

This sub type occurs only in small patches in the eastern portion of Dhanora Ranges and in the western side of Gadchiroli Range. The quality of teak is generally II/III to III/IV. These good quality forests are fairly dense. The density varies between 0.6 to 0.7. The trees are mostly middle aged to mature with scattered matured trees. In general the percentage of teak varies from 20% to 30%. The natural regeneration of *teak* is not satisfactory, whereas the natural regeneration of miscellaneous species like *Ain*, *Bija*, and *Dhaora* is good.

2.2.3. FLORISTICS OF TEAK FORESTS WITH DENSE BAMBOO: Plain Sub Type

(I) TOP STOREY:

Following tree species commonly form the top Storey of these forests:

Local Name	Scientific Name	Local Name	Scientific Name
Ain	<u>Terminalia latifolia</u>	Arjun	<u>Terminalia tomentosa</u>
Bharanga	<u>Kydia calycina</u>	Bija	<u>Pterocarpus marsupium</u>
Dhaora	<u>Anogeissus latifolia</u>	Haldu	<u>Adina cordifolia</u>
Hirda	<u>Terminalia chebula</u>	Jamun	<u>Syzygium cumini</u>
Kusum	<u>Schleichera oleosa</u>	Moha	<u>Madhuca indica</u>
Mowai	<u>Lannea coromandelica</u>	Salai	<u>Boswellia serrata</u>
Semal	<u>Bombax ceiba</u>	Shisham	<u>Dalbergia latifolia</u>
Shivan	<u>Gmelina arborea</u>	Sag/Teak	<u>Tectona grandis</u>
Tendu	<u>Diospyros melanoxylon</u>	Tiwas	<u>Ougenia ogeinensis</u>

(II) Middle Storey:

Middle Storey commonly comprises of the following species:

Local Name	Scientific Name	Local Name	Scientific Name
Achar	<u>Buchanania lanzan</u>	Amaltas	<u>Cassia fistula</u>
Aonla	<u>Emblica officinalis</u>	Bhirra	<u>Chloroxylon swietenia</u>
Garari	<u>Cleistanthus collinus</u>	Ghot	<u>Zizyphus glaberrima</u>
Kumbhi	<u>Careya arborea</u>	Kasai	<u>Bridelia retusa</u>
Karai	<u>Milium velutina</u>	Surya	<u>Xylia xylocarpa</u>

(IIa) Bamboo:

Major species of Bamboo found in the tract is Karka. The rarely found species along the banks of nala is Katang (Bambusa arundinacea).

Local Name	Scientific Name	Local Name	Scientific Name
Karka	<u>Dendrocalamus strictus</u>	Katang	<u>Bambusa arundinacea</u>

(III) Shrubs: Main species of shrubs found in the tract are:

Local Name	Scientific Name	Local Name	Scientific Name
Dikamali	<u>Gardenia resinifera</u>	Jilbili	<u>Woodfordia fruticosa</u>
Kuda	<u>Holarrhena pubescens</u>	Murarphali	<u>Helictres isora</u>

(IVa) Herbs: Prominent herbaceous plants found in these forests are:

Local Name	Scientific Name	Local Name	Scientific Name
Bhuichind	<u><i>Phoenix acaulis</i></u>	Gurmukhi	<u><i>Grewia hirsuta</i></u>
Neel	<u><i>Indigofera cassioides</i></u>	Unhali	<u><i>Tephrosia candida</i></u>
Tarota	<u><i>Cassia tora</i></u>	Diwali	<u><i>Tephrosia hamiltonii</i></u>

(IVb) Grasses: Common grasses are:

Local Name	Scientific Name	Local Name	Scientific Name
Bhurbhusi	<u><i>Eragrostis tenella</i></u>	Chir	<u><i>Imperata officinalis</i></u>
Kusal	<u><i>Heteropogon contortus</i></u>	Mushan	<u><i>Iseilema laxum</i></u>

(V) Climbers:

Climbers are prominent which encircle the trees species for their support and growth.

Local Name	Scientific Name	Local Name	Scientific Name
Gung	<u><i>Abrus precatorius</i></u>	Lalbel	<u><i>Ventilago denticulata</i></u>
Palasbel	<u><i>Butea superba</i></u>	Shataori	<u><i>Asparagus racemosa</i></u>

2.2.4. TEAK FORESTS WITH DENSE BAMBOO:

(b) Hill Sub Type: This sub type is mainly met with on the southern portion of Dhanora Range in Rangi Ex-Jamindari and in the western portion of Gadchiroli Range. Teak is of III/IV quality on top of hills, but as one goes down to the plains quality improves and in general quality is III. The percentage of teak varies from 20% to 30 %. In general natural regeneration of teak is not satisfactory, whereas that of *Dhawda* appears to be satisfactory.

2.2.5. FLORISTICS OF TEAK WITH DENSE BAMBOO:

Hill Sub Type

(I) Top Storey:

Following tree species commonly form the top Storey of these forests:

Local Name	Scientific Name	Local Name	Scientific Name
Ain	<u><i>Terminalia latifolia</i></u>	Arjun	<u><i>Terminalia tomentosa</i></u>
Beheda	<u><i>Terminalia bellerica</i></u>	Bija	<u><i>Pterocarpus marsupium</i></u>
Dhaora	<u><i>Anogeissus latifolia</i></u>	Haldu	<u><i>Adina cordifolia</i></u>
Hirda	<u><i>Terminalia chebula</i></u>	Kalamb	<u><i>Mitragyna parviflora</i></u>
Kusum	<u><i>Schleichera oleosa</i></u>	Lendia	<u><i>Lagerstroemia parviflora</i></u>
Moha	<u><i>Madhuca indica</i></u>	Mokha	<u><i>Schrebera swietenoides</i></u>
Mowai	<u><i>Lannea coromandelica</i></u>	Padar	<u><i>Stereospermum suaveolens</i></u>
Salai	<u><i>Boswellia serrata</i></u>	Semal	<u><i>Bombax ceiba</i></u>
Shisham	<u><i>Dalbergia latifolia</i></u>	Shivan	<u><i>Gmelina arborea</i></u>
Surya	<u><i>Xylia xylocarpa</i></u>	Sag/Teak	<u><i>Tectona grandis</i></u>
Tendu	<u><i>Diospyros melanoxylon</i></u>	Tiwas	<u><i>Ougenia oojeinensis</i></u>

(II) Middle Storey: Middle Storey commonly comprises of the following Species:

Local Name	Scientific Name	Local Name	Scientific Name
Achar	<u>Buchanania lanzan</u>	Amaltas	<u>Cassia fistula</u>
Aonla	<u>Emblica officinalis</u>	Bhirra	<u>Chloroxylon swietenia</u>
Biba	<u>Semecarpus anacardium</u>	Garari	<u>Cleistanthus collinus</u>
Ghot	<u>Zizyphus glaberrima</u>	Kumbhi	<u>Careya arborea</u>
Kasai	<u>Bridelia retusa</u>	Karai	<u>Milium velutina</u>

(IIa) Bamboo:

Major species of Bamboo found in the tract is Karka. The Katang bamboo (Bambusa arundinacea) is rarely found along the banks of nalas.

Local Name	Scientific Name	Local Name	Scientific Name
Karka	<u>Dendrocalamus strictus</u>	Katang	<u>Bambusa arundinacea</u>

(III) Shrubs: Main species of shrubs found in the tract are:

Local Name	Scientific Name	Local Name	Scientific Name
Bharati	<u>Maytenus emarginata</u>	Dikamali	<u>Gardenia resinifera</u>
Eroni	<u>Zizyphus oenoplia</u>	Jilbili	<u>Woodfordia fruticosa</u>
Kuda	<u>Holarrhena pubescens</u>	Kharassi	<u>Nyctanthus arbortritis</u>
Kala Kuda	<u>Wrightia tinctoria</u>	Kharata	<u>Dodonea viscosa</u>
Murarphali	<u>Helictres isora</u>	Nirgudi	<u>Vitex negundo</u>
Safed Phetra	<u>Gardenia turgida</u>	Kukuranji	<u>Calycopteris floribunda</u>

(IVa) Herbs: Prominent herbaceous plants found in these forests are:

Local Name	Scientific Name	Local Name	Scientific Name
Bhuichind	<u>Phoenix acaulis</u>	Chind	<u>Phoenix sylvestris</u>
Diwali	<u>Tephrosia hamiltonii</u>	Gurmukhi	<u>Grewia hirsuta</u>
Neel	<u>Indigofera cassioides</u>	Tarota	<u>Cassia tora</u>
Unhali	<u>Tephrosia candida</u>	Adhanipari	<u>Oxalis scandens</u>

(IVb) Grasses: Common grasses are:

Local Name	Scientific Name	Local Name	Scientific Name
Bhurbhusi	<u>Eragrostis tenella</u>	Chir	<u>Imperata officinalis</u>
Kusal	<u>Heteropogon contortus</u>	Mushan	<u>Iseilema laxum</u>

(V) Climbers:

Climbers are prominent which encircle the trees species for their support and growth.

Local Name	Scientific Name	Local Name	Scientific Name
Chilati	<u>Mimosa hamata</u>	Gung	<u>Abrus precatorius</u>
Lalbel	<u>Ventilago denticulata</u>	Mahulbel	<u>Bauhinia vahlii</u>
Palasbel	<u>Butea superba</u>	Shataori	<u>Asparagus racemosa</u>

2.2.6. TEAK FORESTS WITH SCANTY OR NO BAMBOO:**(a) Plain Sub Type:**

This sub type occurs in small portions mainly around the prominent nalas, where the soil is mostly alluvial. The general quality is III to IV and density varies from 0.4 to 0.6. The Percentage of teak in patches varies from 20% to 30%. As all the best and matured trees from degraded areas have been removed by the Jamindars in the past, the crop is mostly middle aged with a few scattered matured and over matured trees.

2.2.7. FLORISTIC OF TEAK FORESTS WITH SCANTY OR NO BAMBOO:**(a) Plain Sub Type**

(I) Top Storey: Top Storey commonly consists of the following species

Local Name	Scientific Name	Local Name	Scientific Name
Ain	<u>Terminalia latifolia</u>	Beheda	<u>Terminalia bellerica</u>
Bhirra	<u>Chloroxylon swietenia</u>	Bija	<u>Pterocarpus marsupium</u>
Chichwa	<u>Albizia odoratissima</u>	Dhaora	<u>Anogeissus latifolia</u>
Haldu	<u>Adina cordifolia</u>	Hirda	<u>Terminalia chebula</u>
Jamun	<u>Syzigium cumini</u>	Kalamb	<u>Mitragyna parviflora</u>
Kulu	<u>Sterculia urens</u>	Kusum	<u>Schleichera oleosa</u>
Lendia	<u>Lagerstroemia parviflora</u>	Moha	<u>Madhuca indica</u>
Mowai	<u>Lannea coromandelica</u>	Rohan	<u>Soymida febrifuga</u>
Salai	<u>Boswellia serrata</u>	Semal	<u>Bombax ceiba</u>
Shisham	<u>Dalbergia latifolia</u>	Shivan	<u>Gmelina arborea</u>
Surya	<u>Xylia xylocarpa</u>	Teak	<u>Tectona grandis</u>
Tendu	<u>Diospyros melanoxylon</u>	Tiwas	<u>Ougenia oojeinensis</u>

(II) Middle Storey: Middle Storey commonly comprises of the following species:

Local Name	Scientific Name	Local Name	Scientific Name
Achar	<u>Buchanania lanzan</u>	Amaltas	<u>Cassia fistula</u>
Aonla	<u>Embllica officinalis</u>	Garari	<u>Cleistanthus collinus</u>
Ghot	<u>Zizyphus glaberrima</u>	Phetra	<u>Gardenia turgida</u>

(IIa) Bamboo:

Major species of Bamboo found in the tract is Karka. The rarely found species along the banks of nala is Katang (*Bambusa arundinacea*).

Local Name	Scientific Name	Local Name	Scientific Name
Karka	<i>Dendrocalamus strictus</i>	Katang	<i>Bambusa arundinacea</i>

III Shrubs:

Local Name	Scientific Name	Local Name	Scientific Name
Dikamali	<i>Gardenia resinifera</i>	Jilbili	<i>Woodfordia fruticosa</i>
Kuda	<i>Holarrhena pubescens</i>	Murarphali	<i>Helictres isora</i>

(IVa) Herbs: Prominent herbaceous plants found in these forests are:

Local Name	Scientific Name	Local Name	Scientific Name
Bharati	<i>Maytenus emarginata</i>	Gurmukhi	<i>Grewia hirsuta</i>
Neel	<i>Indigofera cassioides</i>	Unhali	<i>Tephrosia candida</i>
Tarota	<i>Cassia tora</i>	Diwali	<i>Tephrosia hamiltonii</i>

(IVb) Grasses: Common grasses are:

Local Name	Scientific Name	Local Name	Scientific Name
Bhurbhusi	<i>Eragrostis tenella</i>	Chir	<i>Imperata officinalis</i>
Dab	<i>Imperata cylindrica</i>	Ghonad	<i>Themeda quadrivalvis</i>
Kusal	<i>Heteropogon contortus</i>	Mushan	<i>Iseilema laxum</i>

(V) Climbers:

Climbers are prominent which encircle the trees species for their support and growth.

Local Name	Scientific Name	Local Name	Scientific Name
Adhanipari	<i>Oxalis scandens</i>	Chilati	<i>Mimosa hamata</i>
Dudhi	<i>Cryptolepis buchanani</i>	Gunj	<i>Abrus precatorius</i>
Kukurranji	<i>Calycopteris floribunda</i>	Mahulbel	<i>Bauhinia vahlii</i>
Palasbel	<i>Butea superba</i>	Shataori	<i>Asparagus racemosa</i>

2.2.8. TEAK FORESTS WITH SCANTY OR NO BAMBOO:**(b) Hill Sub Type:**

This sub type generally found in Rangi Ex-Jamindari of Dhanora Range and Eastern portion of Gadchiroli Range. Teak is generally of III/IV quality

but improves to quality III in patches, where soil is deep and fertile and the percentage of Teak varies from 20% to 50%. The crop is mainly middle aged with a density from 0.4 to 0.6.

2.2.9. FLORISTICS OF TEAK FORESTS WITH SCANTY OR NO BAMBOO:

Hill Sub Type:

(I) Top Storey:

Following tree species commonly form the top storey of these forests:

Local Name	Scientific Name	Local Name	Scientific Name
Ain	<u><i>Terminalia latifolia</i></u>	Bija	<u><i>Pterocarpus marsupium</i></u>
Dhaora	<u><i>Anogeissus latifolia</i></u>	Dhoban	<u><i>Dalbergia paniculata</i></u>
Kalamb	<u><i>Mitragyna parviflora</i></u>	Lendia	<u><i>Lagerstroemia parviflora</i></u>
Moha	<u><i>Madhuca indica</i></u>	Mokha	<u><i>Schrebra swietenoides</i></u>
Mowai	<u><i>Lannea coromandelica</i></u>	Salai	<u><i>Boswellia serrata</i></u>
Teak	<u><i>Tectona grandis</i></u>	Tendu	<u><i>Diospyros melanoxylon</i></u>

(II) Middle Storey:

Middle Storey commonly comprises of the following species:

Local Name	Scientific Name	Local Name	Scientific Name
Achar	<u><i>Buchanania lanzan</i></u>	Amaltas	<u><i>Cassia fistula</i></u>
Aonla	<u><i>Emblia officinalis</i></u>	Apta	<u><i>Bauhinia racemosa</i></u>
Biba	<u><i>Semecarpus anacardium</i></u>	Bhirra	<u><i>Chloroxylon swietenia</i></u>
Dhaman	<u><i>Grewia tilifolia</i></u>	Ganer	<u><i>Cochlospermum religiosum</i></u>
Garari	<u><i>Cleistanthus collinus</i></u>	Ghogar	<u><i>Gardenia latifolia</i></u>
Ghot	<u><i>Zizyphus glaberrima</i></u>	Kumbhi	<u><i>Careya arborea</i></u>
Kasai	<u><i>Bridelia retusa</i></u>	Karai	<u><i>Miliusa velutina</i></u>
Kakai	<u><i>Flacourtia indica</i></u>	Khair	<u><i>Acacia catechu</i></u>
Lokhandi	<u><i>Ixora arborea</i></u>	Palas	<u><i>Butea monosperma</i></u>
Phetra	<u><i>Gardenia turgida</i></u>	Tundri	<u><i>Casearia tomentosa</i></u>
Warang	<u><i>Kydia calycina</i></u>		

(IIa) Bamboo:

Major species of Bamboo found in the tract is Karka. The rarely found species along the banks of nala is Katang Bamboo(*Bambusa arundinacea*).

Local Name	Scientific Name	Local Name	Scientific Name
Karka	<u><i>Dendrocalamus strictus</i></u>	Katang	<u><i>Bambusa arundinacea</i></u>

(III) **Shrubs:** Main species of shrubs found in the tract are:

Local Name	Scientific Name	Local Name	Scientific Name
Bharati	<u>Maytenus emarginata</u>	Dikamali	<u>Gardenia resinifera</u>
Eroni	<u>Zizyphus oenoplia</u>	Jilbili	<u>Woodfordia fruticosa</u>
Kuda	<u>Holarrhena pubescens</u>	Kharassi	<u>Nyctanthus arbotritis</u>
Kala Kuda	<u>Wrightia tinctoria</u>	Kharata	<u>Dodonea viscosa</u>
Murarphali	<u>Helictres isora</u>	Nirgudi	<u>Vitex negundo</u>
Safed Phetra	<u>Gardenia turgida</u>	Kukuranji	<u>Calycopteris floribunda</u>

(IVa) **Herbs:** Prominent herbaceous plants found in these forests are:

Local Name	Scientific Name	Local Name	Scientific Name
Bhuichind	<u>Phoenix acaulis</u>	Chind	<u>Phoenix sylvestris</u>
Diwali	<u>Tephrosia hamiltonii</u>	Gurmukhi	<u>Grewia hirsuta</u>
Neel	<u>Indigofera cassioide</u>	Tarota	<u>Cassia tora</u>
Unhali	<u>Tephrosia candida</u>	Adhanipari	<u>Olax scandens</u>

(IVb) **Grasses:** Common grasses are:

Local Name	Scientific Name	Local Name	Scientific Name
Bhurbhusi	<u>Eragrostis tenella</u>	Chir	<u>Imperata officinalis</u>
Kusal	<u>Heteropogon contortus</u>	Mushan	<u>Iseilema laxum</u>

(V) **Climbers:**

Climbers are prominent which encircle the trees species for their support and growth.

Local Name	Scientific Name	Local Name	Scientific Name
Chilati	<u>Mimosa hamata</u>	Gung	<u>Abrus precatorius</u>
Lalbel	<u>Ventilago denticulata</u>	Mahulbel	<u>Bauhinia vahlii</u>
Palasbel	<u>Butea superba</u>	Shataori	<u>Asparagus racemosa</u>

2.2.10. MIXED FORESTS WITH DENSE BAMBOO:

This type of forests generally occurs in the hilly region. The composition and condition of the crop is the same as one finds in the plains, except that the crops on the hills is not subjected to the same intensity of biotic pressures as in the case of plain forests. These forests are characterised by great diversity in crop composition. The quality of the growing stock is III/IV but improves to III on better sites where the soil is deep. These forests are essentially of miscellaneous type and are characterised by a great variety of species. Teak is mostly scattered and the percentage is quite low. The natural regeneration of teak is scanty whereas miscellaneous species is satisfactory.

2.2.11. FLORISTICS OF MIXED FORESTS WITH DENSE BAMBOO:

(I). Top Storey:

Local Name	Scientific Name	Local Name	Scientific Name
Ain	<u>Terminalia alata</u>	Bija	<u>Pterocarpus marsupium</u>
Dhaora	<u>Anogeissus latifolia</u>	Dhoban	<u>Dalbergia paniculata</u>
Haldu	<u>Adina cordifolia</u>	Kalamb	<u>Mitragyna parviflora</u>
Kasai	<u>Bridelia retusa</u>	Kusum	<u>Schleichera oleosa</u>
Moha	<u>Madhuca indica</u>	Semal	<u>Bombax ceiba</u>
Shisham	<u>Dalbergia latifolia</u>	Sag/Teak	<u>Tectona grandis</u>
Tendu	<u>Diospyros melanoxylon</u>	Tiwas	<u>Ougenia oojenensis</u>

(II) Middle Storey:

Middle Storey commonly comprises of following species:

Local Name	Scientific Name	Local Name	Scientific Name
Achar	<u>Buchanania lanzan</u>	Aonla	<u>Emblica officinalis</u>
Garari	<u>Cleistanthus collinus</u>	Ghot	<u>Zizyphus glaberrima</u>
Kasai	<u>Bridelia retusa</u>	Palas	<u>Butea monosperma</u>
Phetra	<u>Gardenia turgida</u>		

(IIa) Bamboo:

Major species of Bamboo found in the tract is Karka (*Dendrocalamus strictus*).

Local Name	Scientific Name	Local Name	Scientific Name
Karka	<u>Dendrocalamus strictus</u>	Katang	<u>Bambusa arundinacea</u>

(III) Shrubs: Main species of shrubs found in the tract are:

Local Name	Scientific Name	Local Name	Scientific Name
Bharati	<u>Maytenus emarginata</u>	Dikamali	<u>Gardenia resinifera</u>
Eroni	<u>Zizyphus oenoplia</u>	Jilbili	<u>Woodfordia fruticosa</u>
Kuda	<u>Holarrhena pubescens</u>	Kharassi	<u>Nyctanthus arbortritis</u>
Kala Kuda	<u>Wrightia tinctoria</u>	Kharata	<u>Dodonea viscosa</u>
Murarphali	<u>Helictres isora</u>	Nirgudi	<u>Vitex negundo</u>
Safed Phetra	<u>Gardenia turgida</u>	Kukuranji	<u>Calycopteris floribunda</u>

(IVa) Herbs: Prominent herbaceous plants found in these forests are:

Local Name	Scientific Name	Local Name	Scientific Name
Chind	<u><i>Phoenix sylvestris</i></u>	Diwali	<u><i>Tephrosia hamiltonii</i></u>
Neel	<u><i>Indigofera cassioide</i></u>	Tarota	<u><i>Cassia tora</i></u>

(IVb) Grasses: Common grasses are:

Local Name	Scientific Name	Local Name	Scientific Name
Bhurbhusi	<u><i>Eragrostis tenella</i></u>	Chir	<u><i>Imperata officinalis</i></u>
Kusal	<u><i>Heteropogon contortus</i></u>	Mushan	<u><i>Iseilema laxum</i></u>

(V) Climbers:

Climbers are prominent which encircle the trees species for their support and growth.

Local Name	Scientific Name	Local Name	Scientific Name
Chilati	<u><i>Mimosa hamata</i></u>	Gung	<u><i>Abrus precatorius</i></u>
Lalbel	<u><i>Ventilago denticulata</i></u>	Mahulbel	<u><i>Bauhinia vahlii</i></u>
Palasbel	<u><i>Butea superba</i></u>	Phulkia	<u><i>Apluda mutica</i></u>

2.2.12. MIXED FORESTS WITH SCANTY OR NO BAMBOO:

This type is mainly seen in the plains. Major portion of these Forests, adjoining to human habitations has become severely degraded due to heavy biotic pressure. Trees are young to middle aged. Interior forests are heavily infested with climbers like Kukuranji (*Calycopteris floribunda*), Mahulbel (*Bauhinia vahlii*) Palasbel (*Butea superba*) and Eroni (*Zizyphus oenoplia*). The composition of the forests varies but is mostly of miscellaneous type. Teak occurs in scattered patches and is mostly found along prominent nalas and watercourses. The percentage of teak is low. Regeneration of miscellaneous species is either absent or scanty.

2.2.13.FLORISTICS OF MIXED FORESTS WITH SCANTY OR NO BAMBOO:

I. Top Storey:

Local Name	Scientific Name	Local Name	Scientific Name
Ain	<u><i>Terminalia alata</i></u>	Bija	<u><i>Pterocarpus marsupium</i></u>
Dhaora	<u><i>Anogeissus latifolia</i></u>	Dhoban	<u><i>Dalbergia peniculata</i></u>
Haldu	<u><i>Adina cordifolia</i></u>	Kalamb	<u><i>Mitragyna parviflora</i></u>
Kasai	<u><i>Bridelia retusa</i></u>	Kusum	<u><i>Schleichera oleosa</i></u>
Moha	<u><i>Madhuca indica</i></u>	Semal	<u><i>Bombax ceiba</i></u>
Shisham	<u><i>Dalbergia latifolia</i></u>	Teak	<u><i>Tectona grandis</i></u>
Tendu	<u><i>Diospyros melanoxylon</i></u>	Tiwas	<u><i>Ougenia oojeeinesis</i></u>

II) Middle Storey:

Middle Storey commonly comprises of the following species:

Local Name	Scientific Name	Local Name	Scientific Name
Achar	<u>Buchanania lanzan</u>	Aonla	<u>Embllica officinalis</u>
Garari	<u>Cleistanthus collinus</u>	Ghot	<u>Zizyphus glaberrima</u>
Lokhandi	<u>Ixora arborea</u>	Palas	<u>Butea monosperma</u>
Phetra	<u>Gardenia turgida</u>	Rohan	<u>Soyimida febrifuga</u>

(IIa) Bamboo: Major species of Bamboo found in the tract is Karka.

Local Name	Scientific Name	Local Name	Scientific Name
Karka	<u>Dendrocalamus strictus</u>	Katang	<u>Bambusa arundinacea</u>

(III) Shrubs: Main species of shrubs found in the tract are:

Local Name	Scientific Name	Local Name	Scientific Name
Bharati	<u>Maytenus emarginata</u>	Dikamali	<u>Gardenia resinifera</u>
Eroni	<u>Zizyphus oenoplia</u>	Jilbili	<u>Woodfordia fruticosa</u>
Kuda	<u>Holarrhena pubescens</u>	Kharassi	<u>Nyctanthus arbortritis</u>
Kala Kuda	<u>Wrightia tinctoria</u>	Kharata	<u>Dodonea viscosa</u>
Murarphali	<u>Helictres isora</u>	Nirgudi	<u>Vitex negundo</u>
Safed Phetra	<u>Gardenia turgida</u>	Kukuranji	<u>Calycopteris floribunda</u>

(IVa) Herbs: Prominent herbaceous plants found in these forests are:

Local Name	Scientific Name	Local Name	Scientific Name
Bhuichind	<u>Phoenix acaulis</u>	Chind	<u>Phoenix sylvestris</u>
Diwali	<u>Tephrosia hamiltonii</u>	Gurmukhi	<u>Grewia hirsuta</u>
Neel	<u>Indigofera cassioide</u>	Tarota	<u>Cassia tora</u>
Unhali	<u>Tephrosia candida</u>	Adhanipari	<u>Olax scandens</u>

(IVb) Grasses: Common grasses are:

Local Name	Scientific Name	Local Name	Scientific Name
Bhurbhusi	<u>Eragrostis tenella</u>	Chir	<u>Imperata officinalis</u>
Kusal	<u>Heteropogon contortus</u>	Mushan	<u>Iseilema laxum</u>

(V) Climbers: Climbers are prominent which encircle the trees species for their support and growth.

Local Name	Scientific Name	Local Name	Scientific Name
Chilati	<u>Mimosa hamata</u>	Gung	<u>Abrus precatorius</u>
Lalbel	<u>Ventilago denticulata</u>	Mahulbel	<u>Bauhinia vahlii</u>
Palasbel	<u>Butea superba</u>	Shataori	<u>Asparagus racemosa</u>

2.2.14 SOUTHERN DRY MIXED DECIDUOUS FORESTS:

Most of the forests of Gadchiroli Forest Division belong to this category. These forests are characterised by great diversity in composition. The composition and condition of the crop is relatively better and the forests are dense in interior hilly areas because of inaccessibility, while in plains and near human habitations the areas have been subjected to heavy biotic pressure and hence the density is either very low or the areas are devoid of vegetation. Thorny plants occur and tend to increase in proportion with heavy grazing.

2.2.15 In general, the quality of the crop is III to IV. Patches of quality III areas are intermixed with the crop in pockets with deep, moist, fertile and well-drained soils in valleys and along big nalas. In eroded and calcarious soil, crop quality IV is found. The density varies from 0.2 to 0.7. The crop on the whole is young to middle aged with scattered matured and over matured trees. The natural regeneration of almost all the species is found. It occurs in patches in case of *Ain*, *Bija*, *Tendu*, *Dhaora*, *Garari* etc. while it is sporadic and not satisfactory in case of teak and other valuable spp. The establishment of regeneration differs from place to place depending upon the incidence of grazing and fire. The forests adjoining to cultivated tract and human habitations have been subjected to severe exploitation and with result, the forests in these areas are severely degraded.

2.2.16 DRY DECIDUOUS SCRUB:

These forests are found on low broken soil cover and are characterised by the stunted growth of tree species. A thin grass growth is present during a short period otherwise the soil is mostly barren. Many of the shrubs are not palatable or are thorny. These forests are found mostly in isolated patches of Protected Forests surrounded by cultivation and the patches of Reserved Forest close to human habitation where biotic interference is heavy. These forests have been subjected to severe exploitation and encroachments, resulting in to severe degradation and heavy erosion. Woodfordia fruticosa, Maytenus emarginata and Gardenia resinifera spp. are particularly characteristic species of this type.

SECTION – 3: INJURIES TO THE CROP:

2.3.1 The principal causes of injury to which the crop is liable are as under:

A. HUMAN AGENCIES:

2.3.2 FIRE:

There is a long and extremely hot dry season from February to June during which the forests are vulnerable to fires. The fire in the hot, dry season

causes large-scale damage to forests. It prevents the formation of humus by destroying micro flora and fauna and also organic matters. Destruction of the organic matter due to fire results in the prevention of soil formation. Fire is occasionally set by the people with an interest to collect flowers, fruit, good tendu flush and grass. Fire is sometimes caused by the encroachers in the forestland. Considerable damage is caused by the fire to the young crops and the regeneration. The fire affected saplings and poles develop hollowness thereby reducing the timber value. The statement showing forest area burnt due to fire during last twelve years has been given below.

Table No.7
STATEMENT SHOWING EXTENT OF FOREST AREA BURNT

Division	Year	Total Area In Ha.	Forest area Burnt in Ha.	% of area Burnt
Gadchiroli	1993-1994	218529.27	1422.00	0.65
	1994-1995	218529.27	355.00	0.16
	1995-1996	218529.27	8.00	0.003
	1996-1997	218529.27	213.50	0.10
	1997-1998	218529.27	53.00	0.02
	1998-1999	218529.27	28.00	0.01
	1999-2000	218529.27	236.50	0.10
	2000-2001	218529.27	703.63	0.32
	2001-2002	218529.27	513.20	0.23
	2002-2003	218529.27	262.80	0.12
	2003-2004	218529.27	17.00	0.01
	2004-2005	218529.27	83.00	0.04

2.3.3 ILLICIT CUTTINGS:

The pressure of illicit cuttings in the interior hilly areas is comparatively less than that of plains, especially the areas in the vicinity of human settlements. In the interior areas illicit cutting is mostly for the purpose of construction of houses, agricultural implements, firewood, clearing the land for encroachments and extending of cultivation. Due to high prices of timber and firewood, the incidence of illicit felling is high and increasing day-by-day and vast patches of denuded scrublands have been developed in the vicinity of villages. Though there are provisions of nistar supply, it is generally availed by the people those who are not easily accessible to the forests. Most of the timber and firewood is illicitly taken away by the villagers. Removal of green bamboo by illicit cutting is a common feature by locals and artisans (burads). Damages caused by illicit cutting in the past are given below.

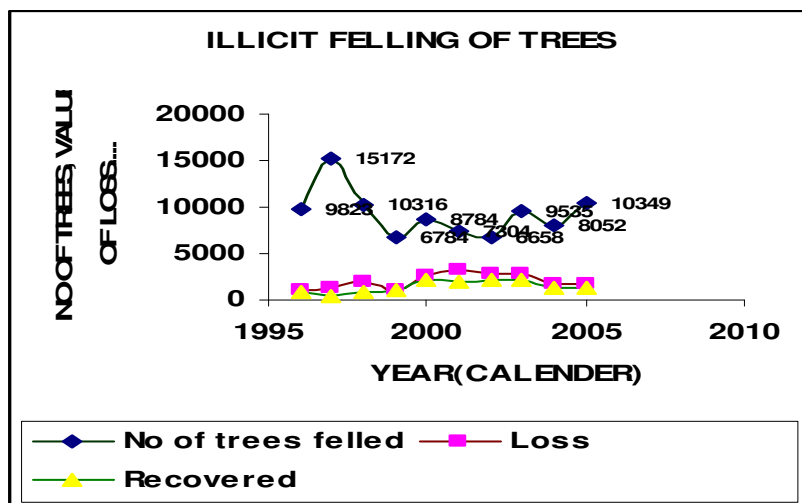


Table No.8

TABLE SHOWING ILLICIT FELLING OF TREES

Year	No of trees felled	Loss of Rs. (in thousands)	Recovery of Rs (in thousands)
1996	9823	1068	891
1997	15172	1214	543
1998	10316	2038	976
1999	6784	1086	998
2000	8784	2684	2195
2001	7304	3217	1861
2002	6658	2787	2232
2003	9535	2753	2100
2004	8052	1641	1398
2005	10349	1820	1281

From the above data it is clear that the number of illicitly felled trees has not decreased and the illicit cutting is not under control. The offence cases registered against illicit cutting, fire, grazing and other forest offences during last twelve years are given in **Appendix No.XX** of volume II.

2.3.4 ENCROACHMENTS:

There are large-scale encroachments, particularly in the Protected Forests in the vicinity of villages for the purpose of cultivation. Absence of proper and correct demarcation and maintenance of boundaries between the revenue and forestland, the deduction of encroachment becomes difficult. A special scheme is required to be prepared by the Dy. Conservator of Forests, to survey and demarcate the protected and new reserved forests immediately to prevent the forests from the menace of encroachments.

Table No.-9
SUMMARY OF ENCROACHMENTS

Sr.No.	Period	No. of Encroachers	Area encroached (in Ha.)
1.	Upto 1978	979	1167.43
2.	After 1978	1452	1510.51

2.3.5 The encroachment on forestland for cultivation purpose between 1972 to 1978 are to be regularized by the Government vide two resolutions R & F D, LEN-1078/3483-G-1, dated 27th December, 1978 and R & F.D.-FLD-1079/1366/F-3, dated 12th September, 1979. The present Government policy is very clear vide two resolutions R. & F.D. No. FLD-1078/144074/F-3 dated 5th March 1980 by which any illegal construction of hut on the forestland should be removed immediately and G.R. No.FLD-1087/PK-397/F-3 dated 14th July 1987 stating that encroachment not likely to be regularized and taken place after 31st March 1978 should summarily be removed. There is a need for stringent measures against the encroachments. The details of encroachments from 1972 to 1978 and after 1978 have been given in **Appendix –LXXIV of Volume II.**

(B) ATMOSPHERIC AGENCIES:

2.3.6 WINDS:

Strong winds blow in February and during the monsoon season. The damage is sporadic and mostly shallow rooted species like teak etc. are uprooted.

2.3.7 DROUGHT:

Damage due to drought is not a serious factor but severe drought affects the young natural growth as well as artificially regenerated plantations.

2.3.8 FROST:

The phenomenon of Frost is unknown in this tract.

(C) OTHER AGENCIES:

2.3.9 GRAZING:

There is steep rise in the cattle population, which resulted in serious biotic pressure for grazing leading to fast degradation of forest in and around the human habitations. Due to heavy grazing soil cover becomes hardened with a result the regeneration diminishes. Some areas are affected by trampling of grazing cattle.

2.3.10 INSECTS AND FUNGI:

The insect damage is negligible in this area although the teak skeletonizers (*Hepalia machaeralis*) and teak defoliators (*Hyblea puer*) cause

damage to the teak areas sporadically. In teak plantations this problem is more severe.

2.3.11 Teak has two major defoliator—*Hapalia inachaeralis* and *Hyblaea pueria*.

2.3.12 *Hyblaea pueria* is a teak defoliator and attacks teak crops during the period of July and August, when the rainfall is maximum. The attack is more severe in pure teak plantation. *Hapalia machaerates*, the teak skeletoniser, usually attack the tree during the end of growing season may be around September. Termites attack the young seedlings at the base of collar especially in the degraded areas. Termites also attack a young pole crop of Dhaora (*Anogeissus latifolia*) and Aonla (*Emblia officinalis*) by girdling them at the base.

2.3.13 Damage by fungi is not uncommon in this area. *Polyporaceous gilvus* attack the sapwood of *Dalbergia sissoo*, *Dalbergia latifolia*, *Acacia arabica* and *Acacia procera* causing white rot. *Ganoderma lucidium* attacks *Dalbergia sissoo*, Neem and *Acrocarpus fraxinifolius*, through the roots. The roots become brittle and leaves become yellow.

2.3.14 PLANT PARASITES AND EPIPHYTES:

Banda (*Dendrophthoe falcata*) occurs occasionally on mahua (*Madhuca latifolia*), achar (*Buchanania lazan*), and ain (*Terminalia alata*).

The following are the important Epiphytic species present in this division *Viscum articulatum*, *Cuscuta* sp., and *Crinum* sp. However, the damage done by the parasites and epiphytes is not of very serious nature.

2.3.15 CLIMBERS AND WEEDS:

Climbers of different species are found in these forests. The common destructive climbers are Kukutranji (*Calycopteris floribunda*), Palasbel (*Butea superba*), Yeroni (*Ziziphus oenoplia*), Chilati (*Mimosa hemata*), Ramdaton (*Smilax macrophylla*) and Mahulbel (*Bauhinia vahlii*). They usually damage the trees of all ages. The regeneration fails to establish where the climbers are heavily infested. The seasonal herbaceous annual climbers also cause damage to the young seedlings.

2.3.16 SOIL EROSION:

The soil erosion is severe along the tract of Garhvi, Khobragarhi, Sati nala and Wainganga rivers and their tributaries. Sheet erosion is common in the entire tract. Gully erosion occurs along the riverbanks. Decrease in soil fertility, lowering of sub soil water level, water holding capacity, change of soil structure are closely related to erosion caused by run-off. Plant cover acts as a very efficient soil binder, checking the flow of water and helping it to percolate downwards. Due to heavy felling, fire and excessive grazing the soil is deprived off its protective cover and consequently in the rainy season the unprotected soil cover is prone to severe impact of raindrops. As a result the soil gets compacted

with consequential loss of its absorbing capacity. The suspended soil particles seal the pore spaces of the soil, while the muddy suspension percolates in to the earth to such a degree that the soil absorbs little water. The excess water while running off, removes the topsoil in which the organic matter, humus, chemicals and other nutrients are stored. The process of soil erosion is at alarming pace in all the areas of the division.

The area needs to be treated by engineering and biological methods through soil and moisture conservation works such as construction of nala bunding, gully plugging, loose boulder structures, ravine reclamation, watercourse stabilization and afforestation of the degraded forests.

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CHAPTER II (B)

THE FOREST FAUNA.

SECTION 2B:1: HISTORY OF WILDLIFE PROTECTION

2B.1.1. The tract dealt with is not rich in wild fauna. But in the past the tract was rich in wild animals. During Jamindari period, wild animals were hunted by Jamindars for pleasure and by locals to meet the requirement of food. That led to the depletion of wild animals both carnivores and herbivores.

2B.2: DISTRIBUTION OF WILDLIFE:

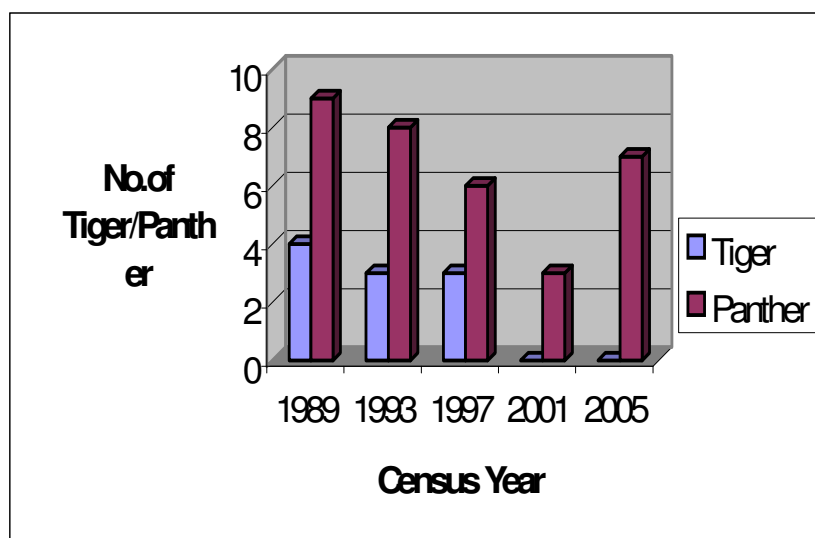
2B.2.1. The wild animals commonly found in the tract are as follows:

2B.2.2. CARNIVORE: A few numbers of carnivores are found in the tract.

(1) **Tiger (*Panthera tigris*):** During the census from 1989 to 2005 the number of Tigers has decreased and during the censuses of 2001 and 2005 no Tiger was reported. The number of tiger & panther during previous censuses is given in the following table.

Census of Tiger & Panther in Gadchiroli Division

Name of Division	Name of the Animal	Year of Census				
		1989	1993	1997	2001	2005
Gadchiroli	Tiger	4	3	3	0	0
	Panther	9	8	6	3	6



Panther (*Panthera pardus*) Panther was found in good number in the past. However, during 2005 census only 6 panthers were reported.

(2) **Hyaena** (*Hyaena hyaena*)

(3) **Wolf** (*Canis lupus*)

(4) **Jackal** (*Canis aureus*)

(5) **Fox** (*Vulpes bengalensis*)

(6) **Jungle Cat** (*Felis chaus*)

2B.2.3. OMNIVORE: Sloth Bear (*Melursus ursinus*),

2B.2.4.: HERBIVORE-

A large number of herbivore is found in the tract forming the prey to carnivore. The species commonly found are: Sambar (*Cervus unicolour*), Chital (*Axis axis*), Nilgai (*Boselaphus tragocamelus*), Wild Boar (*Sus scrofa*), Barking Deer (*Muntiacus muntjak*), Langur (*Presbytis entellus*), Monkey (*Rhesus macaque*) and Hares (*Lepus nigricollers*). **Langur-** langur is mercilessly hunted by the tribals. They trap the langur by felling the trees in groups. It is their traditional practice.

2B.2.5 RODENTS:

There are many rodents found in the tract. Main rodents are: Squirrel (*Petaurista spp*), Porcupine (*Hystrix indica*), Mouse deer, rats, mice etc.

2B.2.6. WILD BIRDS:

The tract is full of avi fauna. Even river tract attracts many avi fauna both native and migratory. Common amongst them are: Painted Sand Grouse (*Pterocles indicus*), Common Sand Grouse (*Pterocles exustus*), Pea Fowl (*Pavo cristatus*), Grey Jungle Fowl (*Gallus sonneratii*), Painted Partridge (*Francolinus pictus*), Grey Partridge (*Francolinus pondicerianus*), Black Breasted Quail (*Coturnix coromandelicus*), Red Spur Fowl (*Galloperdix spadicea*), Crane (Grusantigone), Spotted Bill Duck (*Anas poecilorhyncha*), Pigeon (*Treron phoenicaptera*), Dove (*Streptopelia spp*), Cotton Teal (*Nettapus coromandelianus*), Whistling Teal (*Dendrocygna javanica*) Cuckoo (*Cuculus varius*), Snipe (*Capella galliachges*) etc.

2B.2.7. REPTILES

The tract is full of reptiles. Many types of lizards including monitor lizards are found. Snakes of various types are found. Even crocodiles (Magar) are found in the Wainganga river.

Table No.-10

TABLE SHOWING THE ESTIMATED POPULATION OF WILDLIFE DURING 2001 & 2005

<i>SPECIES</i>	<i>2001</i>	<i>2005</i>
Barking deer	66	51
Chital	96	39
Chausingha	--	5
Hyena	3	2
Hare	53	--
Indian Fox	32	66
Jungle cat	--	8
Langoor	162	119
Nilgai	50	29
Porcupine	--	5
Peacock	53	3
Sambhar	117	42
Sloth bear	--	19
Wild dog	5	10
Wild boar	329	148
Wolf	33	--

Comparing the census of 2001 with 2005 the number of wild animals in each category has considerably decreased due to (i) hunting for food by the tribals (ii) poaching for commercial purpose (iii) habitat disturbance.

SECTION-2B.3: INJURIES TO WHICH THE WILDLIFE IS LIABLE

2B.3.1. The wildlife is liable to the following injuries:

2B.3.2. POACHING

Poaching of wild animals is a common phenomenon in this tract. The local population has the habit of hunting since Jamindari regime. This results in depletion of wild fauna in the tract. The local tribals generally kill the wild animals for the pot. However, poaching of Tiger and Panther is done for their skins and bones. The wild animals and wild birds are illegally killed for its meat, skin, antlers and other trophies. Poachers usually shoot animals on water holes at the time of sunset when the animals visit them for drinking water. Nets or traps are also used for trapping birds, hares, antelopes and deers. The statement showing poaching of animals has been given below.

Table No.11

STATEMENT SHOWING POACHING OF WILD ANIMALS

Year	No.of Wild animals				
	Species	Captured	Hunted	Naturally Died	Total
1	2	3	4	5	6
1993-94	Sambar	--	1	1	3
	Nilgai	--	--	1	
1994-95	Sambar	2			4
	Wild Boar	--	1		
	Panther	--	--	1	
1995-96	Ghodenil	--	1	--	2
	Panther		1	--	
1996-97	Panther	--	1	--	1
1997-98	--	--	--	--	--
1998-99	Wild boar	--	1		2
	Tadas			1	
1999-00	--	--	--	--	--
2000-01	Sambar	--	1	--	1
2001-02	Antelope	--	1	--	2
	Sambar	--	1	--	
2002-03	Sambar	--	1	--	2
	Nilgai	--	1	--	
2003-04	Sambar	--	1	--	2
	Nilgai	--	1	--	
2004-05	Chital	--	1	1	3
	Tadas	--	--	1	
Total	--	2	14	6	22

2B.3.3. FIRE:

The forest fire damages the natural habitat of wildlife and drives the animals towards human habitation where they become easy prey to poachers and local villagers.

2B.3.4.WATER :

Most of the streams, except a few big rivers, become dry during summer. Therefore, animals had to visit only a few waterholes. This makes the villagers and poachers easy hunting of wild animals.

2B.3.5. DISEASES

Wild animals are prone to the disease of domestic animals. As wild animals and domestic animals use common source of drinking water; they are susceptible to diseases pertaining to cattle. In the past Foot and Mouth Disease of cattle spread over wild animals particularly to bison and wild buffalo.

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CHAPTER - III

UTILIZATION OF FOREST PRODUCE

SECTION 1: AGRICULTURAL CUSTOMS AND REQUIREMENTS OF THE POPULATION:

3.1.1. The tract dealt with comprises forest areas presently coming under the administrative control of Gadchiroli Forest Division. The Headquarter of this Division, which was created in 1983, is situated at Gadchiroli, which is the District Headquarter also. The tract is still quite sparsely populated except in the western plains, which are inhabited by cultivators.

3.1.2. New Gadchiroli District was carved out of old Chandrapur District and came in to existence on 26th August 1982. The New Gadchiroli district was divided in to 8 talukas viz Gadchiroli, Chamorshi, Dhanora, Kurkheda, Armori, Sironcha, Aheri and Etapalli. On 7th August, 1992, due to reorganization of Revenue Department, Wadsa (Desaiganj) new Sub-Division was created and four new talukas, viz. Wadsa, Korchi, Mulchera and Bhamragarh were also created. The tract dealt with is spread over civil territories of Gadchiroli, Dhanora, Khurkheda (P), Chamorshi (P), Armori (P) & Korchi tahsils.

3.1.3. POPULATION:

Total population of Gadchiroli District as per 1991 census is 787010, out of which 398364 are males and 388646 are females. The total geographical area of the district is 15,433 Sq.km. Density of population is 51 per sq. km as against 62 per sq.km. of Gadchiroli Forest Division i.e. the tract dealt with. The percentage of urban and rural population is 8.57 and 91.43 respectively The district has 1671 villages, out of which 1503 villages are inhabited while remaining 168 villages are abandoned.

3.1.4. Taluka wise break up of population of Gadchiroli District as per 1991 census has been shown in the Table below. The figures related to population, cattle population, agricultural produce & other socio-economic statistical figures reproduced in this chapter is as per the information received from the District Statistical Officer.

Table No.-12

Taluka wise break up of population of Gadchiroli District as per 1991 census

Taluka	Area in sq. km.	Popula- tion per sq.km.	No.of villages		Town	Figures in thousand		Population In thousand		
			Inhabited	Desert ed		No. of houses	No. of Families	M	F	T
1	2	3	4	5	6	7	8	9	10	11
Gadchiroli	773.4	131	105	16	1	21	22	52	50	102
Armori	1305.12	59	88	12	--	16	16	39	38	77
Kurkheda	1495.97	41	109	8	--	12	13	31	10	41
Dhanora	1950.33	32	216	11	--	12	12	31	31	62

Etapalli.	3954.7	14	109	7	--	10	10	27	27	54
Sironcha	872.3	68	114	34	--	11	13	30	29	59
Aheri	2723.74	29	149	26	2	16	17	40	39	79
Chamorshi	1023.31	13	175	22	--	23	28	68	67	135
DesaiGanj	165.78	386	30	6	1	13	13	32	32	64
Korchi	555.99	63	140	7	--	6	6	17	18	35
Bhamragarh	449.77	51	111	17	--	4	5	12	11	23
Mulchera	163.39	214	76	2	--	7	7	18	18	36
Total	15433.8	51	1503	168	4	151	162	397	370	767

3.1.5. The major area of the District is under forest. The percentage of forest area is 86.67 % of the total area of the District.

3.1.6. As per 1991 census, the population break up of the district on the basis of religion is as under,

Table No. –13

Religion	Population in hundred	Percentage of the total population
1	2	3
Buddhist	640	8.13
Christian	15	0.19
Hindu	7048	89.56
Jain	2	0.02
Muslim	135	1.71
Sikh	2	0.02
Others	28	0.35
Total -	7870	100.00

3.1.7. As per 1991 census, the percentages of population of S.C.& S.T. in the district are 12.20 and 38.70 respectively.

3.1.8 LIFE STYLE PATTERN:

Set in rural environs the population of villages inhabiting this tract is predominantly tribals and others consisting chiefly of *Kunbis, Maharas, Madias, Halbaas, Gonds, Lohars, Mararas. Sonars* etc. who are mainly agriculturists. The cultivation practices are of inferior quality and local population depends largely on forests for livelihood. The local demand is mainly for timber and poles for building purposes and agricultural implements, thatching grass, bamboos and fencing materials. The local population meets almost all the needs from forests. The usual edible flowers and fruits such as moha (*Madhuka latffolia*), tendu (*Diopyros melanoxylon*) and achar (*Buchanania lanzan*) play an important role in the rural nutrition of this tract. Large number of labourers are engaged in tendu leaves collection during summer season. The distribution of workers as per livelihood pattern in the tract dealt with based on 1991 census is given below.

Table No.-14
Distribution of workers as per livelihood pattern

Livelihood Classes	Talukawise No. of persons (in hundreds)					
	Gadchiroli	Armori	Kurkheda	Dhanora	Wadsa	Korchi
1	2	3	4	5	6	7
1.Agriculturists	177	170	185	200	122	123
2.Agricultural Labourers	134	146	79	67	116	35
3.Live stock, Fisheries, Forestry etc.	10	8	3	3	6	1
4.Other Services	90	47	31	26	48	11
5.Marginal Workers	92	43	38	59	25	23
6.Non workers	511	361	282	266	323	146

3.1.9 On the basis of above, livelihood pattern, the population percentages of different livelihood classes are as under

Table No.-15

Livelihood class	% w.r.t. total population
1.Agriculturists	24.32
2.Agricultural Labourers	14.36
3. Live stock, Fisheries, Forestry etc.	77.00
4. Other services	6.30
5. Marginal Workers	7.22
6. Non Workers	47.03

3.1.10 As per 1991 census, in the district out of total population, 358563 are main workers, 64,883 are marginal workers and remaining 363564 are non-workers. This amounts to 45.56 %, 8.24 % and 46.20 % respectively. In the district, out of main workers, agriculturists and agricultural labourers are 56.11% and 28.77 % respectively.

3.1.11 LAND HOLDING:

As per the reports of Agriculture Directorate, Maharashtra State, Pune for the year 1985-86 and 1990-91 the major portions of the cultivated areas belongs to small and marginal farmers. The details of land holding and percentage of landholders is as given below.

Table No.-16
Land holding and percentage of landholders

Land holding In ha.	Percentage of Land holders 85-86	Percentage of Land	Percentage of Land holders 1990-91	Percentage of Land
Up to 02	57.98	23.98	63.97	29.81
02 to 05	31.90	40.40	28.32	40.25
05 to 10	08.04	22.86	06.33	20.27
10 to 20	01.85	10.00	01.28	07.82
Above 20	00.23	02.76	00.13	01.85
Total	100.00	100.00	100.00	100.00

3.1.12. CROP:

Rice is the main agricultural crop of the district. Other crops are wheat, jawari, bajari, maize, pulses & other cereals. Oilseeds, fruits and vegetables are grown on very small scale. As per 1991-92 statistics the areas covered by rice, jawari and pulses were 76.69 %, 4.00 % and 6.62% respectively of the total cultivated land in the tract dealt with.

3.1.13. There are Agricultural Produce Marketing Committees where the agriculturists bring their agricultural produce for sale. Some private traders also purchase the agricultural produce directly from the agriculturists.

3.1.14 IRRIGATION:

The irrigation facilities in the tract dealt with are not very good. Irrigation is done through wells, minor, medium and major irrigation projects, lift irrigation and by pumps fixed on the nalas and rivers. Villages are small and area is indulating. Almost all big villages are having malgajari tanks popularly know as bodi. These tanks are sufficient to meet the irrigation requirement of the villagers. These are required to be deepened so that water could be available through out the year. There is no need of taking irrigation projects in this tract. The construction of big irrigation dam will have detrimental effect on the forest because there is possibility of large scale encroachments around the proposed project area. Hence instead of investing huge amount of money on new projects, it is always advisable to deepen the existing malgajari tanks to increase the storage capacity of the tanks and to make them perennial source of water for all purposes.

3.1.15 CATTLE:

As per the cattle census of 1992, the total cattle population of the district was 8.80 lakhs. Out of these, 63.19 % were cows and bullocks, 9.06 % were he and she buffaloes, 23.85 % were sheep and goats and 2.9 % were other cattle. The density of the cattle is 57 per sq. km. Since most of the agriculturists are either small or marginal farmers, they do not have any grazing lands of their own to graze their cattle. Most of the cattle in the villages graze in the forest only. People are keeping cattle not for milk but for calf and for Farm Yard Manure (FYM)

3.1.16 The Principal requirements for which the people depend on the forests of this tract are as under.

3.1.17 TIMBER:

Teak is the most valuable timber, which is consumed for building purposes; making agricultural implements and house hold furniture. But the yield of teak timber is not much from these forests. Species such as *Bija*, *Saja*, *Dhaoda*, *Bhirra*, *Garari*, *Lendia* and *Khair* are used for timber purposes. These species have gained importance gradually over the years. Teak is mainly used for making bullock cart's body and spokes, *garari* poles are used for rafters, *khair* for stakes, *dhaoda* for axels, *bhirra* for hubs, *tendu* for shafts of carts and *dhaman* for handles. *Mowai* and *Salai* also are used for yokes if *Shiwan* is not available.

3.1.18 FIRE WOOD:

Dhaora, *khair*, *garari*, *birra* etc. are commonly used as fire wood species. *Garari* and *dhaoda* are considered to be the best fuel wood species, but in scarcity any wood species is used as fuel wood.

3.1.19 Due to the increase in population, the demand for firewood, which is the primary source of energy for the human population inhabiting in this tract, is also increased. For firewood, villagers completely depend on forests only. As a result, major portion of forests, particularly plains are not able to meet this demand. Although the demand for firewood is supposed to be met with from the designated nistar zones existing in the Protected Forest areas, due to increase in populations coupled with large-scale encroachments the pressure on the remaining forest areas has increased. Conversion of fuel wood to charcoal and its export to other districts/states has further increased the importance of firewood. Hence, all the coupes due for felling are to be worked fully to meet the domestic and commercial needs of the area.

3.1.20 GRASS:

Thatching grass is of considerable importance and is extensively used by the villagers. The supply falls short of demand comparatively in thickly populated western plains of the tract. Coarse grasses of *Ghonad* and *Kusal* are used for thatching. Since there is no practice of stall-feeding of cattle, the fodder grasses are not cut. Open grazing is to be discouraged and stall-feeding is to be encouraged to improve the regeneration and production of the grasses.

3.1.21 GRAZING:

The local villagers totally depend on forests for grazing their cattle. Stall-feeding of cattle remains unknown in this tract. Grasses used for grazing are *paonia*, *sheda*, *marvel*, *mushan*, *ghonad*, *phulkia* and *kusal*. With the increase in cattle population coupled with an alarming rate of encroachment and loss of productivity in the forest areas, the pressure on the remaining forests have increased sharply leading to degradation of the forests to a great extent. This is high time to take immediate measures for legal and effective protection of these

natural forests from such ruthless and unscientific usage. Rotational grazing and closure of forest areas for management purposes are the concepts, which have been in existence since long and the same should be implemented properly.

3.1.22. BAMBOO:

Bamboo (*Dendrocalamus strictus*) covers over approximately 63% forest areas of the tract being dealt with. It is found mainly in the interior and hilly tracts of Murumgaon, Dhanora, Pendhri and Chatgaon Ranges. Popularly known as poor man's timber, bamboos are used locally for making mats, baskets, agricultural implements and various parts of carts, construction of huts, cattle sheds, fencing of campus and variety of other house hold articles. Small bamboo locally known as Karkas is used for fencing. Bamboo is harvested from all Commercial felling series and some of the Nistar felling series. Every year few coupes from Nistar Bamboo Felling Series are worked departmentally and the extracted bamboo is brought to the depots for supplying nistars. After meeting the local demand, the surplus bamboo is sold in open auction. Bamboo is supplied on concessional rates to local Burads who mainly depend on bamboo for their lively hood. They make mats, baskets, dholis and variety of other household articles from it and sale them locally. They need particularly green bamboo throughout the year. Though small markets are available in almost all the Ranges, Gadchiroli is the main market for bamboo in the tract.

3.1.23 TENDU LEAVES:

The local consumption of tendu leaves is negligible. The collection of tendu leaves is nationalized since 1970-71. From 1991 tendu season, the tendu units are being sold to the purchasers, called as 'licensees' by lumpsum method through tenders. However, as per Government Resolution No. MFP-21-04/Case No.67/F-1 dated 28.2.2006, in the revised lumpsum method from 2006 Tendu season, the expenditure incurred on the collection of leaves is to be deducted from the revenue and the net profit should be distributed amongst the labourers according to the proportionate collection of tendu leaves. The copy of the above G.R. has been given **Appendix –XLVI of Volume II**. Tendu collection is highly labour intensive activity during the peak summer season. However, intense forest fire occurs at the beginning of the season, caused by the human agency with the intention of getting succulent flush of leaves.

3.1.24 OTHER FOREST PRODUCE:

The other forest produce which the villagers take from the forests are edible flowers and fruits, fibers from bark and roots, gum, honey, wax, lac, herbs, thorns and leaves. The main species of edible flowers and fruits are *Mahuwa*; and fruits of *Charoli*, *Tendu*, *Achar*, *Kawat*, *Bel*, *Khirni*, *Aonla*, *Jamun*, *Karonda*, *Bor*, *Harra*, *Baheda* etc. Leaves of *bel*, *palas*, *mahul* and gum of *dhaoda*, *khair*, *palas*, and *dikamali* are used locally. Fibres are extracted from *palas*, *palasbel* etc. Thorns of *bharati*, *hiwar*, *yeroni*, *chilhati*, *ghots*, *bor* and *babul* are used for fencing. Cords

and lashes are made from the bark of *kuda*, *apta* and roots of *palas*. Lac is collected from *palas*. Locals, particularly the tribals use these forest produce for their own use and also sell some of them locally to supplement their meagre income. The purchase of *Moha flowers*, *gum*, *hirda* in notified areas is done by T.D.C. in order to avoid exploitation of tribals by the traders. Statement showing out-turn of major and minor forest produce in Gadchiroli Division are given in [Appendix No.XII](#).

SECTION- 2: MARKET AND MARKETABLE PRODUCE:

3.2.1. MARKETS:

Gadchiroli has been one of the important centers of marketing of forest produce since long back. Besides this, Chandrapur and Desaiganj (Wadsa) are also important marketing centers adjoining the tract. The name ganj itself indicates that this was an important marketing place of forest produce. The area had beautiful forests all around and the main activities were related to forestry only. Historically Desaiganj has been an important center of market for timber, charcoal, tendu patta and other forest produce.

3.2.2 The forests of Gadchiroli Division are commercially worked for timber, poles, fuelwood, bamboo & minor forest produce such as tendu leaves, *moha*, *gum*, *beheda*, *hirda*, *aola* etc. Though, the part of these produce is locally consumed, the bulk of it is exported out of district and even out of state. Timber and poles after extraction from the coupes are brought to the sale depot for auction and nistar supply. The major sale depots are at Gadchiroli, Dhanora & Chatgaon and purchasers mostly are from Nagpur, Yeotmal, Gondia, Chandrapur, Wardha, Bhandara districts of Maharashtra and near by districts of Andhra Pradesh & Madhya Pradesh attend the auction. Ballarshah, in Chandrapur district, is one of the main marketing centers for teak and miscellaneous timber and charcoal in India.

3.2.3 Fuel beats are either brought to the sale depot for auction or are sold in jungle depots. Major quantity of fuel wood was exported out side after conversion in to charcoal. The main export center for charcoal is Wadsa located on Chandrapur-Gondia Railway route. Chandrapur is also another important center to export charcoal to Bombay and other parts of the country.

3.2.4 Wadsa and Chandrapur are the main markets for Tendu leaves from where the leaves are exported to Nagpur, Bhandara and other states viz. Andhra Pradesh, Karnataka and Tamilnadu for manufacture of bidies.

The annual coupes are worked either by the department or through FLCS. The timber and firewood are brought to the timber depot at Gadchiroli where periodic sales are held. Purchasers from Nagpur, Yeotmal, Amravati, Wardha, Akola, Dhulia districts of Maharashtra and nearby districts of Andhra Pradesh attend these sales for timber and poles.

3.2.5 Every year few coupes of Nistar Bamboo Felling Series are worked departmentally, and all the commercial and remaining Nistar Babmoo Felling Series are harvested and consumed by the Ballarpur Paper Mill. Trucks are used for transportation of bamboo bundles directly from jungle depots to the Paper Mill at Ballarshah. The bamboo extracted from the remaining nistar coupes by the department is brought to Dhanora, Chatgaon & Gadchiroli Depots for supply to the locals, particularly the burads & agriculturists on concessional rates. The surplus bamboo is sold in open auction at respective depots and the purchasers from different parts of the state attend the sale.

3.2.6 Other minor forest produces like *moha flowers, moha seeds, charoli, gum* etc. are sold in the weekly markets in different villages or sold to the local shop keepers, traders etc. Collection of NTFPs like *moha flowers, moha seeds, gum, hirda* in notified area is done by T.D.C. through its collection centers. In comparison to T.D.C. collection centres, the locals are attracted by private contractors for their better services like quick purchase, immediate payment etc. and major part of these produce go out of hands of T.D.C. Hence, the better co-ordination between the forest department and TDC is important.

MARKETABLE PRODUCE:

A. MAJOR FOREST PRODUCE:

3.2.7 TIMBER AND POLES:

There is a great demand for teak timber and poles above 15 cm. girth. Among miscellaneous species, timber and poles of *Bija, Saja, Birra, Dhaora, Garari, Tinsa, Khair, Rohan, Tendu* are also readily sold. *Salai, Mowai and Semal* logs above 60 cm.girth are preferred for packing cases. *Salai* has limited market during orange season at Nagpur. *Semal* logs above 75 cm. girth are preferred in match industry. Poles are used as pit props by collieries. The species commonly used are *tendu, bhirra, dhaora, surya, garari, lendia and ain* etc. To fetch better prices and for proper utility, poles and timbers should be sold as early as possible after harvesting.

3.2.8. FIRE WOOD:

There is a heavy demand of firewood in plains. *Garari Dhaora and Bhirra* and many other inferior species are considered as the best fuel wood species. Fuel wood is stacked in the form of fuel beats usually of size 2 m. x 1.2 m x 1 m. and are sold in open auction at various depots.

B. MINOR FOREST PRODUCE:

3.2.9 BAMBOO:

Bamboo is of great demand in this tract. Ballarpur Paper Mill consumes the major part and the secondary demand is of the local people for their various uses. Traders from Nagpur, Gondia, Chandrapur, Nashik also purchase large quantities of long bamboo for the purpose of commercial sales. Bamboo

pieces of 12 ft., 10 ft., 9 ft. and 6-ft. length are of great demand for the purpose of props in Orange, Grapwine and Tomato gardens.

Paper Mill removes bamboo in the form of bamboo bundles. Each bundle has 20 pieces of 2 Mt. long. After extraction these are transported to the local dumping depots sanctioned at various places in the division and the same are transported from dumping depot to the mill during the rainy season. The long Bamboo and bundles harvested departmentally are generally sold in open auction. The scheduled rates of timber, fuel and bamboo are given in **Appendix No.XVIII.**

3.2.10. TENDU:

It is one of the most important revenue earning forest produce of the division. It is sold to the purchasers, called as 'licensees' by lumpsum method through tenders at state level. The lump-sum system of tendu sale has been adopted since 1991-92. There is a great demand of tendu leaves for the manufacture of bidis. The leaves, after collection, dried, packed and stored in godown by the licensees and thereafter transported to bidi manufacturing centers within and out side the state. The details of yield and revenue from tendu leaves collection in Gadchiroli Division are given **Appendix No.LV** of volume II.

3.2.11. GRASS:

The broom grass is sold in open auction. Other grasses are consumed by locals.

C. OTHER FOREST PRODUCE:

3.2.12. Moha flowers and seeds, *charoli, gum, honey, wax, edible fruits, non-edible fruits, roots, barks, leaves of palas*, fencing materials, *hides, horns* etc. are other marketable produces. Some of the produces in notified areas are purchased by T.D.C. through the local tribals are given in **Appendix –LXXVI of Volume II.**

Quarrying and removal of soil, murum, and boulders from forest areas requires prior permission of Government of India under the Forest (Conservation) Act, 1980.

SECTION - 3: LINES OF EXPORT:

3.3.1 ROADS:

There is an adequate network of forest roads throughout the division. Many of these roads have been strengthened and upgraded by the B & C Department and Z.P. and converted in to metal and blacktop roads. These roads are being maintained by either B&C department or Z.P. A number of fair weather roads and cart tracks link the remote forests of this division. With the prior permission of forest department, BILT also prepares and maintains some roads in the remote areas of forests for transportation of bamboo bundles. All the villages and hamlets of the area are well connected by all weather roads in the division after formation of the district.

3.3.2. Gadchiroli–Brahmapuri-Nagpur, Gadchiroli-Armori-Wadsa, Gadchiroli-Mul-Chandrapur, Gadchiroli-Chatgaon-Dhanora-Murumgaon, and Gadchiroli-

Potegaon, are the main lines of road transport to which many feeder roads are linked. These ensure transport throughout the year all over the district.

3.3.3. Construction of new bridge across Wainganga on Gadchiroli-Bramhapuri road in the recent past has reduced the distance between Gadchiroli to Nagpur. Also Construction of bridges across Wainganga between Mul-Gadchiroli and Wadsa-Bramhapuri and across her tributaries in the recent past has tremendously improved the road communication. Though many forest roads have been converted in to metal and blacktop roads, further efforts are being made to up-grade and strengthen the interior roads of the area so as to facilitate the mobility.

3.3.4. Some of the forest roads are being maintained by the forest department. The list of existing roads in the tract has been given in the **Appendix – IX of Volume II.**

3.3.5. RAILWAYS:

Wadsa on Chandrapur-Gondia railway route serves as the main line of transport of firewood, *hirda*, *beheda* and other NTFPs to Nagpur. The major railhead for the transport of timber to the other parts of the country is Ballarshah located on Delhi-Chennai Railway route.

SECTION - 4: METHODS OF HARVESTING AND THEIR COST:

3.4.1. AGENCY FOR HARVESTING:

Till 1980 forest coupes, for timber and firewood, were worked through three agencies viz; (i) By department, (ii) through Forest labourer's co-operative society and (iii) by Contractors. However, as per the policy decision taken by the Government of Maharashtra vide Revenue and Forest Department No. FCT/1581/93544/F-1, dated 04/04/1981, harvesting by contractor system was totally stopped, with few exceptions, w.e.f. July 1981. Now main felling and thinning of coupes are either worked departmentally or through F.L.C.S. Some of the subsidiary silvicultural operations were carried out departmentally. There after during the implementation of B.P.Singh's plan, all the silvicultural operations were carried out either departmentally or through FLCS.

3.4.2. In the absence of Working Plan or Working Scheme in the past, though the annual coupes were not worked, bamboo coupes were worked uninterruptedly, to avoid congestion in the bamboo clumps. BILT harvests bamboo in C.B.F.S. and some of the N.B.F.S. areas. In the remaining N.B.F.S. areas bamboo harvesting is carried out departmentally in order to meet the demand of local nistar as well as for sale in open auction.

3.4.3. Tendu leaves trade has been nationalized by the Govt. of Maharashtra Act No. LVII of 1969. Tendu leaves were collected by the department through agents till 1990 season. Since 1991 season the tendu units were sold on "lumpsum" basis. At present the tendu units are sold in open auction by inviting tenders and the tendu leaves are collected through successful bidders. The area of

Gadchiroli Division is divided into 35 units/groups of units. The collection of tendu leaves commences from the last week of April each year and continues up to the first week of June. The labourers deliver the leaves at various collection Centers called 'Phadis'. At each collection center the leaves are cured, processed and then packed in gunny bags. The quantity of tendu leaves is measured in Standard bags of 1000 bundles (pudas) in each. The collection target of tendu leaves for the division is 66200 standard bags per year.

3.4.4. The notified NTFP in scheduled areas is collected by the TDC. In non-scheduled areas tendu units are sold through tender sale.

3.4.5. METHOD OF FELLING AND EXTRACTION:

Boundary demarcation & marking is completed at the end of March and the felling starts after rainy season. Each coupe is divided in to equal number of sections. Each section will not exceed 20 ha. Felling is carried out section wise. Timber, poles and firewood are simultaneously extracted and transported to Jungle depots located within 3 Km. from the coupe. All the details of materials extracted are recorded in the logging & felling register, measurement book and jungle depot register simultaneously. Firewood is stacked in the form of beats having size of 2 Mt.x1.2 Mt.x 1.0 Mt. and the same is sold either at jungle depots or at sale depots at Range headquarters. The Timbers and poles are transported to the Central depots through departmental trucks or by private transporters.

3.4.6. After felling and conversion into logs and poles, measurements are taken and the details such as the tree number and the number of log are embossed at the butt end of the logs, with the help of digit nails. Besides this, the mark of passing hammer is also made.

3.4.7. After arrival of the log in the sale depot, it is given a serial number and re-measurement is done. The differences in measurements at the jungle depot and at the sale depot are reconciled.

3.4.8. All the logging operations are done by engaging local labourers in case of the departmental working and by the members of the F.L.C.S., in case of coupes worked by F.L.C.S. Most of the items of work are done on fixed job rates. Conservator of Forests fixes the schedule of rates for each item of works, by constituting a Wage board committee every year. The rates sanctioned by the committee are circulated to all the Dy. Conservator of Forests for their ready use. However, in case of variable items (e.g. jungle depot cleaning, provision of shade, No. of mukadams to be engaged, depot expenses etc.) , the discretion of fixing the item wise expenditure for FLCS is vested with the Dy. Conservator of Forests. For exploitation, only the improved logging tools such as peg tooth saw, band saw, bow saw etc. are used. In no case trees are to be felled by axe. However, axe can be used while cutting the branches below 30 cm. girth and also for preparing firewood below 30 cm.

3.4.9. Bamboo is cut with the help of sharp axe, which is specially made for the purpose. Bamboo is generally cut 4" above the ground; cut should be slanting without any splits. Cut should be always above the internodes without split.

Silvicultural rules are to be strictly followed while felling the bamboo. In each clump a minimum of 8 bamboos of 3 years age, all 2nd year and 1st year bamboos are to be retained and the remaining bamboos of three years and dead and dried bamboos are exploited. Based on the quality of bamboo it is converted into long bamboo or bamboo bundles. After working, cleaning of clumps is done. In case of small clumps where commercial bamboo is not available only cleaning operations are to be carried out to facilitate the growth and development of new culms. After completion of exploitation and measurement of bamboo and bamboo bundles, they are transported to the sale depots for disposal.

3.4.10. COST OF HARVESTING:

The Govt. of Maharashtra has increased the minimum wages for daily wage labourers in the forest department with effect from 1-7-04, as per G.R. No. MWA/5293/7588/7 dated 02-07-03. As per the above G.R. the minimum daily wage rate fixed is as follows:

Table No. - 17

S.N	Nature of work	For 8 hours work
1	Light unskilled work	Rs. 69.65
2	Heavy unskilled work	Rs. 77.35
3	Skilled work	Rs. 85.04

3.4.11. In the above rates the cost of living allowance, as sanctioned by the labour commissioner, is added every year in the month of October. Due to this the wage rates changes from year to year. Based on the wage rate, the wage board committee constituted at circle level prepares the rate structure for each item of work and gives the approval and the same is circulated to all Dy. Conservator of Forests. Schedule rates of labour charges are given in **Appendix No.XI.**

Table No.-18

Statement showing average cost of production of Long Bamboo and Bamboo bundles in Gadchiroli Forest Division.

Sr. No.	Year	Average Production Cost (Rs)	
		Long Bamboo	Bamboo bundles
1	1994-95	6.00	14.00
2	1995-96	7.00	15.00
3	1996-97	7.00	10.00
4	1997-98	8.00	11.00
5	1998-99	8.00	12.00
6	1999-00	9.00	16.00
7	2000-01	9.00	16.00
8	2001-02	9.00	16.00
9	2002-03	10.00	16.00
10	2003-04	7.00	13.00
11	2004-05	9.00	18.00
12	2005-06	13.00	25.00

SECTION- 5: PAST AND CURRENT PRICES:

3.5.1 The statement showing the average market rates of various forest produce at Central and Local Depot in Gadchiroli Forest Division are given below.

Table No.-19
Statement showing average market rate of various Forest Produce (In Rs.)

Year	Timber in m3		Per Fuel Beat		Per Pole		Per Bamboo	
	Teak	Non-teak	Teak	Non teak	Teak	Non Teak	Long	Bundle
1995-96	13986	4355	882	363	28	8	7	15
1996-97	11808	8436	1271	204	72	31	7	10
1997-98	10510	6707	833	255	75	40	8	11
1998-99	15594	4677	835	265	63	35	8	12
1999-00	15076	4633	1524	812	48	40	9	16
2000-01	15476	4667	1686	836	91	55	9	16
2001-02	14799	6966	6306	725	72	42	9	16
2002-03	14850	6970	923	1166	83	38	10	16
2003-04	14219	5000	250	488	52	23	7	13
2004-05	13164	5943	595	620	109	56	9	18
2005-06	15000	7000	5833	451	79	110	13	25

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CHAPTER- IV

IMPACT OF FIVE-YEAR PLANS

4.1. Till 42nd Amendment to the Constitution of India in 1976, Forest was a Subject of State List. State used to look upon forests as resources for generating revenue to its exchequer. Gadchiroli Forest division was one of the revenue generating division of the State. Parts of forests were worked before independence on scientific line in consonance with prepared working plans/schemes. Emphasis was made on the improvement of forests and exploitation of matured and valuable timber trees. After independence, ex-proprietary forests were also brought under the management of Government. Wildlife was treated as source of recreation. Till late seventies of last century no plan fund was allotted to forestry sector in the tract. About 90% of the total geographical area of the district is covered by dense forests. Silvicultural operations in the tract were always at the top priority. Earlier, the forestry sector was the only sector providing the employment to the people. From early eighties of last century, Special Action Plan was initiated under Tribal Sub Plan. But the share for forestry development was still decimal. Being the remotest tract of the district, even plan was not prepared for the development of forests from such component. Forestry remained the revenue generating machine. For running forest machinery only Non Plan expenditure was done with meager plan resources. Even today, the percentage of Plan expenditure in the District is less than 5%. Forest Department shares its 7% revenue to Zilla Parishad for development of Forests through Zilla Parishad. But the development through Z.P. has been seldom done except construction of some roads and raising few plantations.

4.2. FIRST FIVE YEAR PLAN (1951 to 1956):

The First Five Year Plan was aimed at rehabilitation of degraded forests, introduction of economic species and survey and demarcation. Gadchiroli Forest Division was not separate division in this period. Also most of the reserved forests and protected forests were not with the forest department, rather they were directly under Jamindars. Jamindari Forests were brought to State under Indian Forest Act, 1927 and declared as Protected Forests under section-30. Working Plan of Singh & Mazumdar was in operation. The impact of 1st Plan was not noticeable, as flow of funding was never made available to the tract for requisite achievement.

4.3. SECOND FIVE YEAR PLAN (1956-1961):

Just like 1st five year plan, the 2nd five year plan was also aimed at rehabilitation of degraded forests, introduction of economic species, survey and demarcation. Working Plan of Singh & Mazumdar was in operation. During that period the tract dealt was not having separate identity. Protected forests were annexed to forest department during that period and intention of State Government to constitute the Protected Forests to Reserved Forests were notified in 1959.

4.4. THIRD FIVE YEAR PLAN (1961-1966):

The Third Five Year Plan was aimed at increasing the productivity of forests through planting of fast growing species, scientific assessments and modern logging. No working plan was in operation. No plan expenditure was incurred. Operations were revenue oriented. Gadchiroli Forest Division came into existence from East Chanda Forest Division.

4.5. POST THIRD FIVE YEAR PLAN (1966-1969):

During this period no plan was in operation. The tract was under severe drought and people were suffering under deep poverty and the major concern was to provide work and civil amenities to the people.

4.6. FOURTH FIVE YEAR PLAN (1969-1974):

Just like 3rd Five Year Plan, the 4th Five Year Plan aimed at increasing productivity of forests through planting fast growing species, scientific assessments and modern logging. Many successful plantations were raised during this period. No direct funding was made available from plan component.

4.7. FIFTH FIVE YEAR PLAN (1974-1979):

5th Five Year Plan aimed at large scale plantation, social forestry and forest conservation. During this period forestry works were carried out as per Kartar Singh's plan (1977-78 to 1991-92). Forest Department took various development activities in the forests and raised successful plantations. No plan fund was made available.

4.8. ANNUAL PLAN (1979–80) & SIXTH FIVE YEAR PLAN (1980 – 85):

The aim of 6th Five Year Plan was towards Social Forestry and fuel wood reserves to save natural forests. The District is having about 90% of the total geographical area under very good forest cover. Hence, there was no dearth of fuel wood. Also there was no scope for Social Forestry in community land. The tract experienced the emergence of naxalism due to the decision of State Government to regularize the encroachments on forestland for the period from 1/4/1972 to 31/3/1978. That had created an atmosphere that encroachment on forestland is bound to be regularized in due course of time. It has got tacit support of Naxalites. Various schemes for protected forests were implemented. Due to naxalism forestry works got affected from time to time. Tract used to get direct funding from Tribal Sub Plan. But forestry sector did not get its due share up to its potential. Not even 1% of total allocation of District was given to Forest Department. The Present Gadchiroli Forest Division was carved out during this plan period.

4.9. SEVENTH FIVE YEAR PLAN (1985-90):

The basic aim of 7th Five Year Plan was forest conservation, massive afforestation and wasteland development. Tribal Sub Plan was providing funds to

various developmental activities in the tract. Forestry sector share was dismal. Kartar Singh's working plan was in operation. Various schemes were in operation till 1986-87. Due to ban on tree felling, conversion activities got affected. Plantation activities were taken under various plan schemes, but were not successful.

4.10. EIGHTH FIVE YEAR PLAN (1992--1997):

The 8th Five Year Plan was aimed at preservation of biological and genetic diversity (both flora and fauna), protection of forest against biotic interference, utilisation of wastelands, and promotion of people's participation through Joint Forest Management (JFM). During this period concept of Participatory Forest Protection through people's participation started. World Bank Funded Forestry Projects were implemented to boost the infrastructures and enhance the productivity of forests. B.P. Singh's consolidated working plan for entire forest areas of the tract was under operation. Due to Naxalite activities there is a great impact on the implementation of plan schemes. Even forestry activities were not allowed to run smoothly resulted in over all development was not achieved to the maximum extent due to unhealthy conditions and terror created by anti social elements.

4.11. NINTH FIVE YEAR PLAN (1997 - 2002):

Just like 8th FYP, 9th FYP aimed at preservation of biological and genetic diversity (both flora and fauna), protection of forest against biotic interference, utilisation of wastelands, and promotion of people's participation through Joint Forest Management (JFM). The State government had started various schemes in consonance with central government schemes. World Bank Funding for forestry works ended with this plan period. The tract faced challenges from anti social elements in the developmental activities and implementation of working plan. Tract received little fund from plan source to achieve the objectives of plan. Forestry sector augmented through World Bank added Forestry Project.

4.12. TENTH FIVE YEAR PLAN (2002-2007):

The present Five Year Plan is in operation. The wave of Joint Forest Management in its various incarnations is now getting momentum in the tract. Though Forest Development Agency, a Central Government Added Project had been sanctioned, people are reluctant to come forward to work in Naxalite affected villages. It appears that they are getting full support from naxalites for not participating in JFM. Assaulting of forest personnel, particularly, beat guard and foresters by the Naxalites is common. Thus the tract is experiencing a peculiar situation, which is against the long-term objective of development. Even implementation of existing working plan or project prescriptions is not being allowed to be carried out in some sensitive areas by naxalites. To have a greater impact on the socio-economic development, the public, the law enforcing and various developmental agencies must have a common understanding and work together for the development of the tract.

4.12.1. During the preparation of National Forestry Action Programme, it has been pointed out that basic purpose of the NFAP is to establish direct linkage between the national forest policy and the national five-year plans. In the past there

has not been a comprehensive and constant programme structure for forestry and every plan had its own programme structure. The percentage share of forestry sector outlay has changed from 0.32 percent of the total outlay in First FYP to 0.94 percent in Eighth FYP. The highest allocation was in the Seventh FYP (1.09%). For the sustainable development of the sector, allocation to the forestry sector should be raised to about 4 to 5 percent of the total outlay of the country. Similarly, in the tract also, the plan allocation must be in conformity with national perspective to achieve objectives of the nation and forest as the forest area is to the extent of 90% of the total geographical area of the District. Hence forestry sector here needs even more financial allocation to develop the tract and people.

4.12.2. As per Socio-Economic Survey of Gadchiroli District for 2003-04, published by Economics and Statistics Department Maharashtra State, the Plan and EGS Allocation for Forest Department of Gadchiroli District are as below:

<u>Item</u>	<u>District</u>	<u>Forest Department</u>	<u>% allocation</u>
Plan	1,880.48 lakh	50 lakh	2.66%
EGS	11,490.94 lakh	619.94 lakh	5.04%

Even for EGS works, out of 417 proposed works, sanction was given to 32 works and financial allocation of 150 lakh was made for five Forest Divisions in total.

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CHAPTER –V

STAFF AND LABOUR SUPPLY

SECTION-1: STAFF:

5.1.1 The forests of the tract being dealt with are in the administrative control of Gadchiroli Forest Division, which was carved out from East Chanda Division in 1983 as a result of reorganization of the Forest Department. The areas of this division originally belonged to the North Chanda Division which was reorganized vide G.R.No.FDM/1358/3093-II-J, Bombay-1 dated 5th May, 1959 to East Chanda and West Chanda divisions and a portion was transferred to the Central Chanda Division subsequently vide G.R. of the R. & F Department No. FDM/1880/F-2, dated the 29th August 1983, the East Chanda Division and West Chanda Division were again split and reorganized into Wadsa, Gadchiroli and Bramhapuri Divisions.

5.1.2 Previously the division was having only 4 ranges. As the area of beat, round and range was vast and it was difficult to manage efficiently with the existing staff. It was therefore essential to reduce the size of the beat, round and range for efficient protection and management. As per the Tata Consultancy Service Report, Gadchiroli Forest Division was reorganized into six ranges for protection and six ranges for development. Similarly rounds and beats had also been reorganized into protection and development categories. However, with this reorganized set up the aims and objectives of efficient protection and management was not satisfactory. Hence as per GR FDM-2003/File No.168/F-2, Mantralaya, Mumbai-400 032, dated 10th November 2005, Gadchiroli Division was further reorganized into 9 territorial ranges, 37 rounds & 150 beats. The details of Range, Round and Beat and its area has been given in **Appendix –XXI of Volume II.**

5.1.3 The name of Territorial ranges and its headquarters in Gadchiroli Division are given in the following table.

Table No.-20

Sr.No.	Name of Division	Division Headquarter	Name of Ranges	Range Headquarter
1	Gadchiroli	Gadchiroli	Gadchiroli	Gadchiroli
2			Potegaon	Potegaon
3			North Dhanora	Dhanora
4			South Dhanora	
5			Kunghada	Kunghada
6			Chatgaon	Chatgaon
7			Pendhari	Penthari
8			East Murumgaon	Murumgaon
9			west Murumgaon	

5.1.4 In the establishment there are 146 permanent posts and 158 temporary posts in Gadchiroli Forest Division. This is as per the present sanctioned strength of the staff after reorganization. The following statement shows the details of staff.

Table No.-21
Details of Staff of Gadchiroli Division

Sr. No.	Category and Designation	Number of Posts.			Pay Scale
		Permanent	Temporary	Total	
1	2	3	4	5	6
Gazetted Officer					
1	Dy.Conservator of Forests	1	0	1	Rs.10000-15200 (Jr.Administrative Grade) Rs.12000-16500 (Senior Time Scale)
2	Assistant Conservator of Forests	3	1	4	Rs.7450-11500
3	Range Forest Officer	6	8	14	Rs.6500-10500
Non-Gazetted Employees					
4	Chief Accountant	1	0	1	Rs. 5000-8000
5	Forester	15	42	57	Rs. 4000-6000
6	Accountant	4	6	10	Rs. 4500-7000
7	Surveyor	1	0	1	Rs. 4000-6000
8	Clerk	13	7	20	Rs. 3050-4590
9	Forest Guard	97	84	181	Rs. 2750-4400
10	Driver	1	4	5	Rs. 3050-4590
11	Peon	2	2	4	Rs. 2550-3200
12	Watchman	1	2	3	Rs. 2550-3200
13	Dak-runner	0	1	1	Rs. 2550-3200
14	Cleaner	0	1	1	Rs. 2550-3200
15	Daftari	1	0	1	Rs. 2610-4000
Total		146	158	304	

5.1.5 The list of Divisional Forest Officer/Deputy Conservator of Forests who were in charge of Gadchiroli Division since 1983 and onwards is given in Appendix No.XIII.

5.1.6 The forest labourers under plan or non-plan schemes, who had served in the forest department as casual daily wage labourers for a period of five years continuously with at least 240 working days in each year as on 01.11.1994, were appointed as "forest labourers" on temporary (supernumerary) posts vide R & F.D. G.R. No. LAV 1094/CN 252/F-9, Mantralaya, Mumbai 400 032, dated 31st January 1996. These posts will be abolished automatically on superannuation. Today there are 125 forest labourers working in Gadchiroli Forest Division.

5.1.7 The details of Revenue and Expenditure in Gadchiroli Forest Division for the last thirteen years has been given below.

Table No.-22
STATEMENT SHOWING THE REVENUE AND EXPENDITURE

Sr. No.	Division	Year	Revenue Realized in Lakhs.	Expenditure in lakhs.
1	2	3	4	5
1	Gadchiroli	1993-94	859.78	154.74
2	Gadchiroli	1994-95	1517.69	170.57
3	Gadchiroli	1995-96	692.47	224.94
4	Gadchiroli	1996-97	832.10	294.39
5	Gadchiroli	1997-98	656.53	307.86
6	Gadchiroli	1998-99	992.59	347.59
7	Gadchiroli	1999-00	626.62	420.42
8	Gadchiroli	2000-01	984.92	402.14
9	Gadchiroli	2001-02	665.04	463.89
10	Gadchiroli	2002-03	392.07	514.17
11	Gadchiroli	2003-04	518.10	679.94
12	Gadchiroli	2004-05	814.28	648.58
13	Gadchiroli	2005-06	578.06	654.89

SECTION-2 LABOUR SUPPLY:

5.2.1 In general the tract is sparsely populated and density of population in interior areas of the forest is very sparse. As the tract comes under tribal sub plan, besides the forestry and agricultural activities, other departments are also carrying out various developmental works for the up-liftment of local people. Considerable number of labourers comes even from Andhra Pradesh, Madhya Pradesh, Chattisgarh States during bamboo harvesting and tendu season. Skilled labourers for charcoal manufacture are imported by contractors from Rajasthan. Acute shortage of labourer is felt during monsoon season as all the labourers are engaged in agricultural works.

5.2.2 However, the labourer shortage during harvesting season of bamboo, timber and firewood can be overcome through proper planning and coordination with the neighboring areas where the operations are not in force.

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CHAPTER - VI

PAST SYSTEMS OF MANAGEMENT

SECTION - 1: PAST HISTORY OF THE FORESTS:

6.1.1. The tract dealt with under this working plan cover basically the following types of forests. (1) Reserved Forest A - class and B class commonly called as old Reserved Forests. (2) Protected Forests, which were Ex-Proprietary Forests and major areas of which have been declared as Reserved Forests in 1992 and these newly reserved areas are commonly called as New Reserved Forests (3) Un-notified Areas in possession with the division & (4) the Zudpi Jungle in possession with the division. The major categories of forest areas are Reserved Forest & Protected Forest, which have different histories and hence are being discussed here.

A. RESERVED FORESTS:

6.1.2. The old Reserved Forests dealt with under the plan were reserved in 1879 under the Indian Forest Act (VII th of 1878) vide the Central Province Gazette Notification No. 917 (i) dated 24th February 1879. These Old Reserved Forest Areas form a very small percentage, i.e. 7.85 % of the total area of this Division. No description of the forests at the time of reservation was available, but the absence of large sized trees, as observed by Shri C.E.Hewetson in his plan 1936-37 to 1945-46 showed that the Forests were subjected to maltreatment by shifting cultivation and illicit felling for meeting the local demands. After reservation of these forests, the quantum of protection also increased. Fire Protection works were introduced in 1879 and were gradually extended over all the reserves.

6.1.3. Commutation system introduced after reservation was in force up to 1889. The commuters could remove their requirements as per their choice from any part of the forest convenient to them. Thereafter this system was replaced by licence system. The licence holders used to select and cut the trees from any part of the forest till 1893, after which timber, green fuel and bamboos were felled from localized areas. Grasses, dry fuel and minor forest produces were also obtained from the forests. Earlier, Kosa cultivation was permitted over the whole area, but later on it was restricted to only excised area.

6.1.4. The Old A Class Reserved Forests of Gadchiroli Forest Division are covered in 31 compartments and 2942.82 ha of B Class Reserved Forests are distributed in 9 villages & covered in 10 compartments. The formation of compartments in B Class forests was done during the preparation of previous plan. These forests were the part of the Wairagarh Range of Chanda Forest Division untill the end of 19th Century. Later in 1901, after reorganization, Wairagarh Range came under the control of North Chanda Forest Division. These forest areas were later attached to the Gadchiroli Range, which was formed after the reorganization of North Chanda Forest Division into East Chanda Forest Division and West Chanda Forest Divisions in 1959 and were under the administrative control of the

former. Later after reorganization in 1983, Gadchiroli Range was divided into Gadchiroli and Chatgaon Ranges and Dhanora Range was divided into Dhanora and Murumgaon Ranges. Besides this after reorganization, compartment no. 315 of Dhanora Range was transferred to Armori Range of Wadsa Forest Division and compartment numbers 291 & 292 of Armori Range were transferred to Chatgaon Range. Along with the compartment numbers 191 & 292 and an area of 454.47 ha of B Class reserved forests and 865.50 ha of unmanaged Protected Forests were also transferred from Armori Range to Chatgaon Range. On further reorganization in 1983, the East Chanda Forest Division was divided into Wadsa, Gadchiroli and Brahmapuri Divisions and finally with this latest reorganization the areas being dealt with came under the administrative control of Gadchiroli Forest Division.

B.PROTECTED FORESTS:

6.1.5 The Protected Forests of the tract dealt with were owned by Jamindars upto 1951. Admeasuring of 201964.75 ha. Protected Forests within the tract dealt with were owned by jamindars up to 1951.

6.1.6 Under the provisions of Madhya Pradesh Abolition of Proprietary Rights (Estate, Mahals, alienated) Act, 1950 (1 of 1951), these Jamindaries or proprietary areas came to vest in the state government. Subsequently between April/1951 to December /1951 these areas were transferred to Forest Department for their scientific management by the then Madya Pradesh Government. Subsequently these forests were declared as Protected forests under sec 29 of I.F.A., 1927, Notified vide M.P. Gazette Notification No.3056-1216-XI, dated 4th June 1955 and Bombay Gazette Notification No. FLD/1056-12623-F dated 8th August 1957, published on 3rd October 1957. Further the Government of Bombay declared their intension to constitute these forests as reserved forests under section 4 of I.F.A., 1927 vide Bombay government gazette Notification No. FLD/1258/II-3314-E dated 30th May 1959, which was published 20th August 1959.

6.1.7 For the purpose of completion of enquiries in to the rights over these forests, the Forest Settlement Officer was appointed for Sindewahi, Bramhapuri, Warora and Mul tahsils on 12th February 1960. The Forest Settlement Officer completed his enquiries about the settlement and submitted his final report with his recommendations to the Commissioner, Nagpur vide his letter no. WS/FRSO/1340/75 dated 13th September 1975. The Government of Maharashtra has approved the recommendations of the F.S.O. and the forests have been reserved under section 20 of the Indian Forest Act, 1927, vide Notification No. FLD 3685/9316/ CR-42/F-3, dated 5th May, 1992. The Government has declared 169727.31 ha forest areas as Reserved Forest.

SECTION - 2: PAST SYSTEM OF MANAGEMENT AND THEIR RESULTS:

A. RESERVED FORESTS (1900-1926):

6.2.1 The Reserved Forest areas of the tract being dealt with originally belonged to the Wairagad Range of Chanda Forest Division. First working plan of this Range, which covered reserve forest of the present Wadsa, Kurkheda, Armori, Chatgaon and Gadchiroli Range, was prepared between 1897 to 1900 by A.F.

Lawrie. This plan was quite simple and prescribed improvement felling all over the area. Coupes were opened to purchasers who could remove any tree not marked for reservation. Forests, in which there was sufficient demand, were worked but the valueless trees were not felled, while in the coupes where the demand was small, only best of the unreserved stems were removed.

THE WORKING PLAN OF VAHID (1927-1935):

6.2.2 This was one of the first plans prepared after carrying out detailed study of forest types and quality classes, stock mapping and prescribed intensive management.

6.2.3 This plan prescribed three working circles, viz. (1) High Forest Working Circle, to be worked under uniform system (2) Coppice with standard Working circle with 30 years rotation and (3) Low Forest Working Circle with 30-40 years rotation.

6.2.4 Best Forest areas were placed under the High Forest Working Circle where conversion to uniform system was prescribed with rotation period of 60 years. This working circle contained 11 felling series.

6.2.5 In the Coppice With Standard Working Circle, medium quality forests were placed on a 30 years rotation with *Teak and Bija* being prescribed as the most suitable standards. Eight felling series were formed.

6.2.6 Teak and mixed forests considered, unfit for working, were placed in the Low Forest Working Circle to be worked in 30 to 40 year rotation according to the quality of each felling series. This working circle contained 55 felling series.

Remaining poor areas and forests were allotted to the Low Forest Unworked Working Circle in which no regular working was prescribed.

There was no Bamboo Working Circle during this plan period. The Silvicultural System prescribed was clear felling. Thinning works were not carried out because there was no sufficient demand for poles and small timbers.

6.2.7 In the A- class Reserved Forest Areas main fellings were carried out completely. Thinnings were not carried out partly because of insufficient demand and partly because many coupes did not require thinning.

6.2.8 In B- class forests beyond compartment No. 271 were not compartmentalized and worked.

THE WORKING PLAN OF HEWETSON (1936-1948):

6.2.9 The earlier Working Plan was revised within eight years by Hewetson. After analyzing the causes for the failure of certain prescriptions, he concluded that clear felling was unsatisfactory for the areas having bamboos, except where established reproduction of teak was sufficient to form future crops and that it was

equally unsuitable for non-bamboo areas of low density where trees were either too large to coppice or were bad coppicers. He, therefore, recasted Wahid's Plan and modified the prescriptions suitably.

6.2.10 Under this plan the better quality forests continued to be managed for production of large timber. The forests of poor quality were managed for the production of poles and fuel. In such forests, regeneration was expected to be chiefly by coppice.

6.2.11 All inferior and open forests and those too distant from the market were excluded.

6.2.12 The following working circles were formed.

I. COPPICE WITH STANDARD WORKING CIRCLE WITH 40 YEARS ROTATION:

6.2.13 Rotation of coppice was fixed 40 years whereas the rotation for standards was not fixed due to lack of growth statistics of the species concerned. This working circle was allotted all the areas of High Forest Working Circle and Low Forest Working Circle of previous plan as well as other areas situated fairly closed to markets in which the forests were sufficiently dense and valuable to make harvesting possible.

II. MISCELLANEOUS WORKING CIRCLE:

6.2.14 Areas having inferior and open forests and those too instant from the markets for profitable harvesting were placed in this working circle.

III. BAMBOO WORKING CIRCLE (OVERLAPPING):

6.2.15 This was an overlapping working circle with 3 year felling cycle.

6.2.16 Out of 31 compartments that cover the old Reserved Forest areas of the present plan, only 18 compartments i.e. 203 to 219 and 272 were allotted to miscellaneous working circle. The rest of the area being "B" class remained in blocks and were not covered by the Plan.

THE WORKING PLAN OF SINGH AND MUZUMDAR (1949-50 To 1963-64):

6.2.17 Under this plan all A-class forests were stock mapped showing the quality classes and types of forests. Forests having teak 15% and more were shown as teak forests and the remaining as miscellaneous forests. Quality classes fixed on the basis of height classes. Under stocked areas and blanks too were indicated. The toposheets did not give any indication of density of the crop and the condition of regeneration.

6.2.18 The forests were classified for the first time on the functional basis into tree forests, minor forests, pasture forests and misc. forests. The following working circles were formed keeping in view of the above classification.

V. COPPICE WITH RESERVE WORKING CIRCLE:

6.2.19 This working circle covered practically the whole of the workable areas. The forests included were much varied in composition, density and quality of growing stock. Practically few minor forests and few tree forests, which could not be conveniently separated from management, were allotted to this working circle. Reserved Forests compartment numbers from 210 to 219, which were earlier, placed in the Misc. working circle were for the first time allotted to the Bothali (Comptt. No.210-214) and Gadchiroli (Comptt. No. 215-219) felling series. The chief object of management was to supply small timber, poles, firewood, fodder and grazing. Rotation was fixed to 40 years and the yield regulation was done by area.

6.2.20 RESULTS OF WORKING:

- (a) Area subjected to light to moderate grazing, the regeneration was good but the areas subjected to heavy grazing specially in small isolated blocks, the regeneration failed to establish. Severe soil erosion was noticed.
- (b) Cleaning in the 8th year were not carried out, due to which, timber species suffered from congestion and a heavy infestation of climbers in good quality areas.
- (c) Mid rotation thinnings were noticed to be usually heavy amounting to felling of reserves. The trees reserved at the time of main felling were found to be removed against the working plan prescription.

VI. MISCELLANEOUS WORKING CIRCLE:

6.2.21 Areas with open stocking and forest villages were allotted to this working circle. Compartment numbers 203 to 209, 294 and 298 to 307 belonging to reserved forests covered in the plan presently under revision come under the Administrative Control of Gadchiroli Forest Division, were allotted to this Working Circle. Removal of dead and diseased trees was permitted by issuing licence to villagers to meet their Nistar requirements.

THE WORKING PLAN OF KARTAR SINGH (1977-78 TO 1991-92) :

6.2.22 The working plan by Singh and Muzumdar was up to the year 1963-64. The revision of this plan could not be undertaken in due time i.e. in the year 1962, because the working plans for Allapalli and Pedigundam ranges were under revision at that time. In 1966 it was decided to prepare separate plans for East Chanda, West Chanda and part of Central Chanda Divisions. Kartar Singh started preparations of Plan in 1972, which came into force since 1977-78.

6.2.23 Kartar Singh set his objects according to the National Forest Policy guidelines. The methods of treatment adopted were based on the functional classification of forests viz. (i) Protected forests (ii) Tree forests (iii) Minor forests and (iv) Pasture lands.

6.2.24 Tree forests included were well-stocked mixed forest, which according to him were capable of producing good quality *Teak and Semal*. In these forests natural reproduction of teak and other important species like *Bija, Shisam, Semal* etc. was deficient. These forests occur mostly in undulating tracts. He found that these areas are suitable for concentrated fellings and therefore, decided to prescribe as 'Uniform system' for these forests by clear felling and planting. Closure for eight years from the year of plantation and then an average incidence of grazing 5 acres per cow unit was prescribed.

6.2.25 Minor forests included all areas containing inferior tree growth, which were capable of producing mainly firewood and poles. In these forests grazing was decided to be provided to the maximum possible extent. The management of these forests were on the basis of sustained yield of firewood, poles and fodder. The incidence of grazing was fixed at 1.5 to 2 acres per cow unit. These forests were further divided into following three categories.

- (a) The marginal areas which were subjected to adverse biotic influence, which has resulted into the failure of regeneration and prescribed these areas to be worked under improvement felling supplemented with soil conservation operations and compensatory plantations to enrich the growing stock. The grazing closure is prescribed for seven years after the main felling. The felling cycle was of 20 years.
- (b) The B –class reserved forests, which had been first worked during the last plan, contained preponderance of malformed tree growth and had been subjected to unrestricted grazing. These forests were also prescribed to be worked under improvement felling as in (a) above.
- (c) The better-stocked forests, which had regenerated well under the coppice with reserve system in the last plan, were continued under the same system with a rotation of 40 years. These areas were to be closed for grazing for six years.

6.2.26 Grass beds were to be formed in areas where acute demand for fodder existed in Mul, Rajoli, Gadchiroli, Armori, Vyahad and large number of other villages.

6.2.27 These grass beds were permanently closed for grazing and were required to supply the fodder grass for stall-feeding the cattle. In such areas better grass varieties are to be introduced.

6.2.28 The remaining forests were either under the process of disforestation or were classified as B-class forests to be given for cultivation or transferred to

other departments. Hence these areas were allotted to the Miscellaneous Working Circles.

6.2.29 Accordingly Kartar Singh's plan prescribed the following working circles.

- (i) Conversion Working Circle
- (ii) Coppice With Reserve Working Circle,
- (iii) Improvement Felling Working Circle,
- (iv) Kuran Working Circle,
- (v) Misc. Working Circle

6.2.30 The reserved forest areas of Gadchiroli forest Division to be covered under this plan belong to (i) Improvement Felling Working Circle and (ii) Kuran working circle. These forests, which today admeasure 14247.80 ha were divided into 31 compartments, 30 of which were allotted to the 7 felling series belonging to the improvement felling working circle. The remaining only one compartment i.e. compartment number 302 of Chatgaon Range belongs to Kuran working circle. The respective areas under these two working circles were 14007.50 ha under the improvement felling working circle and 240.30 ha under the Kuran working circle.

6.2.31 The compartments allotted to the 6 felling series of improvement working circle were the marginal areas, which had generally failed to regenerate due to adverse biotic factors in the last plan. These areas were covered with miscellaneous forests and were considered liable to soil erosion. The former B-class forest areas contained malformed tree growth and had been subjected to heavy biotic pressure due to their occurrence in the proximity of human settlement.

6.2.32 Main objects of management were to control soil erosion, and improvement of soil cover, improvement of malformed crop, regeneration of various species by natural and artificial means.

6.2.33 The crop density was generally 0.5 and below with small patches having density above 0.5. The crop was mostly young to middle aged with patches of matured trees in understocked areas and along the nalas. The presence of young trees in atleast two of the felling series viz. Bothali and Gadchiroli can be explained as these felling series belong to the coppice with reserve working circle in the previous working plan. For the rest of the areas there were no special prescriptions given in Singh and Mazumdar's plan. This was perhaps one of the most important reasons for the degradation of these areas.

6.2.34 The prescriptions for areas included in the improvement felling working circle were to remove only dead and worthless trees, to tend the regeneration and to plant up understocked areas with suitable species. The favoured species were Teak (which did not occur there) *Bija*, *Shisam*, *Tinsa*, *Haldu*, *Ain* and *Semal*. A felling cycle of 20 years was prescribed with no rotation fixed.

Yield was to be regulated by area. The treatment was to be given in two parts as under:

(a) Understocked and eroded areas having density below 0.4:

For these areas only climber cutting was prescribed. Plantation of species like *Neem*, *Sisoo*, *Khair*, *Tendu* and *Moha* were prescribed at 3 m. x 3 m. spacing. Soil conservation works were also prescribed.

(b) Remaining areas:

All dead and unsound hollow trees to be removed, patches containing advance growth of teak to be opened up, coppices to be singled, *Garari* of 45 cm. and above g.b.h. to be removed and D-grade thinning to be carried out in the well grown natural pole crop of teak up to 45 cm. in g.b.h. were prescribed. Subsidiary silvicultural operations were also prescribed.

6.2.35 A preliminary inspection of these areas, however, reveals that there has been further degradation in the forests. There are encroachments in the compartments near villages. The old plantations are mostly failure. It seems that only felling operations were carried out in coupes and subsequent tending operations were not done. In many compartments demarcation is altogether absent. The working plan prescriptions in that compartment have not been followed at all. Status of boundaries is dismal, protection of plantation is poor and approach to forest management is cursory. This is about the past management of the Reserved Forest of the tract. Closure as prescribed in the Working Plan for management purpose is a practice unknown for the tract.

THE WORKING PLAN OF B.P.SINGH & ASHOK SHARMA (1993-94 to 2003-04):

6.2.36 Kartarsingh's plan was replaced by B. P.Singh and Ashok Sharma's Plan. This is the first combined Working Plan comprising of the old reserved forest, new reserved forest and remaining protected forest as well as un-notified forests. The main object of this plan was to supply sustained yield of timber, poles and firewood as per local and commercial demand. The following working circles have been discussed.

- a) Selection Cum Improvement Working Circle
- b) Afforestation Working Circle
- c) NTFP (Overlapping) Working Circle.
- d) Tussar Working Circle
- e) Wildlife (Overlapping) Working Circle.
- f) Bamboo (Overlapping) Working Circle.

SELECTION –CUM-IMPROVEMENT WORKING CIRCLE:

This working circle comprised of areas, (i) All felling series of selection-cum-improvement working circle except Dhekni (P), Goorhool (P), Kanasi (P) and Hanpaili (P); and (ii) some of the felling series, consisting of site quality III/IV areas, coppice with reserve working circle of V.K.Prabhu's scheme. The total area allotted to this working circle was 148195.86 ha. (67.81% area of the division) distributed over Gadchiroli, Chatgaon, Dhanora and Murumgaon ranges. The areas allotted to this working circle comprised of *Ain, Bija, Dhawda, Shisham, Tendu, Bhirra, Haldu, Garadi, Moha and Surya* and with a crop density of 0.4 to 0.6. The areas also had a dense under storey of bamboo with considerable degree of congestion in the clumps. Regeneration of miscellaneous species was satisfactory. To increase the percentage of crops gap planting of teak was suggested. The harvestable girth (gbh) for *Teak, Ain, Bija, and Haldu* was 135 cm., 125 cm for other species, and 45 cm. for *Khair, Lendia and Garadi*. The felling cycle was 20 years. The yield was regulated by area and K.P.Sagreya's modification of Smithies formula was used for yield calculation. Natural regeneration was supplemented by artificial regeneration of teak through gap planting. Areas containing more than 800 seedlings per ha. were treated as adequate and less than 800 seedlings per ha. were treated as inadequate in regeneration. Subsidiary silvicultural operations and cutback operations were prescribed in the following year of the main felling. Cleaning works in the 6th year and thinning works in the 11th year of the main felling were prescribed. The areas of main felling coupes were to be protected from fire and grazing atleast for a period of 5 years.

AFFORESTATION WORKING CIRCLE:

This working circle comprised of (i) All felling series and their part of Selection Cum-Improvement Working Circle. (ii) All felling circles of CWR of V.K.Prabhu's scheme, (iii) All the areas of IWC of Kartar Singh's plan (iv) All the areas of un-managed forests in 42 villages in 19 compartments, and (v) All the areas of "B" class reserved forests in 9 villages. The total area allotted to this working circle was 69761.22 ha. (31.92% area of the division), distributed over Gadchiroli, Chatgaon, Dhanora and Murumgaon ranges. The area was highly depleted and comprised of species mainly *Dikamali, Jilbili, Kuda, Kharata, Barati, Lokhandi* etc. These areas were situated in the vicinity of human habitations and were subjected to heavy biotic pressure. Soil is highly compact with many patches of blank areas. Patches of miscellaneous forests with less than 0.5 density was also noticed in some areas, having tree species of *Ain, Dhawda, Bhirra, Garadi, Moha, Bija, Lendia, Movai, Palas, Tendu* etc. The main objects of this working circle were (i) To reclaim the area by intensive soil and moisture conservation works, (ii) To enhance the productivity through artificial regeneration by planting indigenous species of small timber, firewood and fodder yielding species (iii) Involvement of local people in the participatory management of the forests and (iv) To maintain bio-diversity. No regular silvicultural system was prescribed. Only tending of existing tree growth in the continuously hacked rooted stock areas was prescribed. No appreciable yield was expected as the areas were degraded. Artificial regeneration supplemented with rooted stock was prescribed. The choice of species suggested

was *Teak*, *Shivan*, *Semal*, *Hirda*, *Behada*, *Aola*, *Bamboo* and other miscellaneous species. Planting of grasses such as *Sabai*, *Khus*, *Pawnya*, *Sheda* etc. was also suggested. Planting of *Dodonea*, *Mehendi*, *Curry-patta*, *Glyricidia*, *Jatrofa* and *agave* on mounds of contour trenches was prescribed. Subsidiary silvicultural operations such as cleaning operations in the 6th year and thinning operations in 11th year of main felling was prescribed. Protection of the areas from fire and grazing for a period of five years was prescribed.

NON-TIMBER FOREST PRODUCE (OVERLAPPING) WORKING CIRCLE:

This working circle comprised of the entire area of Gadchiroli forest division. The area has got potential to produce maximum quantity of Moha flower, Moha seed, myroblans, gum, broom grass, honey, wax, lac, Sitafal, valuable grasses and many medicinal plant species. The main object of this working circle was to contribute sizeable revenue to the state government and to provide employment to the local people through collection of these N.T.F.Ps. during the off-season. Strict tapping rules and regulations were introduced to prevent any damage to the gum yielding trees such as *Kulu*, *Dhawra*, *Ain*, *Khair* etc. Introduction of sales of NTFP units in non-scheduled areas was prescribed. Planting of *sabai* grass was also prescribed.

TUSSAR PLANTATION WORKING CIRCLE:

This working circle included the areas where people have been traditionally doing tussar silkworm rearing on naturally growing *Ain* and *Arjun* trees. About 572 ha. (0.26% area of the division) area was allotted to this working circle distributed in Gadchiroli, Chatgaon and Dhanora ranges. About 286 families of 26 villages were doing this practice. These areas were mainly situated near human habitations. The crop consists of mainly *Ain* and *Arjun* species, which were pollarded and sparsely distributed. The main objects of this working circle was (i) To restore the degraded forest land (ii) To encourage the people's participation in forest management, and (iii) to uplift the economic status of the poor villagers. The whole of 572 ha. was to be covered in 9 years starting from 94-95 to 2002-03. The distribution of the area was 76 ha. in 94-95 covering 38 families and 62 ha. to 31 families in all the subsequent years. However, selection of families was left to the discretion of Dy. Conservator of Forests, Gadchiroli. The optimum size of area to be allotted to each family was 2 ha. The tussar plantations were prescribed at spacing of 1.2 x 1.2 mt. with inter planting of *sabai* grass at 40 x 40 cm. in 30 x 30 x 30 cm pits. The main food plant species to be planted are *Ain*, *Arjun*, *Sehana*, *Bor* and *Anjan* whereas the secondary food plants are *Hirda*, *Behada*, *Dhawda*, *Jamun* and *Kumbhi*. Tending operations were suggested as per the guidance of Khadi Grmodyog Employees. Three crops in a year was suggested. First crop in July to August, second crop Sept to October and third crop from November to December. The tussar cultivation requires relatively more humidity and better productivity of cocoons is attained at 60% relative humidity. The return per acre varies from Rs. 1000/- to 3000/- depending on the climatic conditions. No timber is harvested. *Sabai* grass was to be harvested annually to make ropes as a subsidiary activity. Areas under this working circle were to be managed by the forest protection

committees under the guidance of Forest Department. The protection from grazing, fire and illicit felling was suggested.

WILDLIFE (OVERLAPPING) CIRCLE:

This working circle comprised of the entire area of the division. The main object of this working circle was (i) to preserve and develop the existing wildlife in this tract and (ii) to develop infrastructure for wildlife viz. Waterholes, anicuts. No regular schemes were prescribed for management of wildlife. However, general protection to the wildlife was prescribed through constant vigilance. Development of waterholes, provision of saltlicks was suggested. Retention of 2 or more dead trees per ha. will act as snags and den trees for nesting and resting of wild animal was prescribed. Trees of commercially no utility may be used for this purpose. Planting of fruit species for wildlife was suggested. Maintenance of record of persons having firearms licence within 10-km. radius of forest was prescribed.

BAMBOO (OVERLAPPING) CIRCLE:

This working circle comprised of all bamboo areas either natural or planted. No new felling series were formed. The total area of the working circle was 120659.52 ha distributed over all the ranges in which bamboo area is 80289.35 ha. General character of this tract is the same as that of other working circle. The main bamboo species, which occur in this tract, is *Dendrocalamus strictus*, which forms the under storey in the better quality forests. It occupies mostly on hill slopes and dense along the nalas and in moist slopes. Very few scattered clumps of Katang bamboo (*Bambusa arundinacea*) occur on the banks of nalas. About 3678 clumps of this species is located in compartment No. 146 of Dhanora range. Bamboos are mainly used for making mats, baskets, temporary walls and variety of products by the local artisans called burads. The main objects of this working circle was (i) To harvest bamboo scientifically on sustained basis (ii) to meet the nistar demand of local people and artisans (iii) To meet the commercial demand of paper and pulp industry and (iv) To improve the productivity of bamboo in the area. Harvesting of bamboo in 3 years cycle was suggested in cutting series of A, B, C. Harvesting of bamboo was banned between 15th June 30th September. Bamboo clump (ranzi) was considered to be fit for harvesting only when it contains more than 12 matured culms (bamboo). Retention of atleast 8 matured bamboos per clump to support first and second year bamboo was suggested. Cutting of bamboo 15 to 45 cm above ground level was suggested. Use of sharp implements was prescribed to cut the bamboo. Digging of rhizomes, lopping of bamboo for fodder, use of tender bamboo for bundling was strictly prohibited. Disposal of debris 2mt. away from the clump was suggested. Special care was suggested in case of gregarious flowering of bamboo. Tending operations at the age of 1 to 3 year, 3 to 8 year, and crop of above 8 years were prescribed. Protection of Bamboo area from fire and grazing was also suggested.

RESULTS OF PAST MANAGEMENT:

B.P.Singh & Ashok Sharmas' working plan envisaged mainly on **Selection-cum-Improvement Working Circle** aiming at production of large size timber to meet the local demand and to increase the proportion of valuable tree species by planting valuable timber species such as teak in the gaps and in places where there is inadequate natural regeneration. Out of 148195.86 ha. only 23661.79 ha area was worked under SCIWC (15.97%). This low percentage of working was mainly due to non-availability of funds and naxalites problem. Subsequent subsidiary silvicultural operations were not taken up promptly, due to which the crop is highly congested, affecting the natural regeneration as well as the coppice growth. Natural regeneration is adequate in interior areas and scanty near habitations. Proportion of unwanted plant species and climbers have gone up adversely affecting the crop growth. The worked areas were not protected from fire, grazing and illicit felling. The areas under this working circle are also subjected to encroachment and illicit fellings frequently. Due to partial implementation of the plan, huge loss of revenue to the state government as well as loss of employment generation to the local people occurred during last 10 years. Large number of over matured trees, which were not felled in time, were subjected to the effect of heavy windfall and burning due to fires in summers causing heavy losses.

In **Afforestation Working Circle**, out of 69761.22 ha only 13905.91 ha (19.94%) was worked during the plan period. Plantation activities was done only in 1054 ha area, out of which 25 ha is teak plantation, 574 ha bamboo plantation & 450 ha is miscellaneous plantations. During last 10 years, the survival percentage of the plantations is not satisfactory. The very purpose of improving the area through afforestation works could not be achieved. Major portion of the area under this working circle left unattended.

In **NTFP (Overlapping) Working Circle**, enough importance was not given and valuable NTFP could not be harvested fully causing huge losses of revenue to the government and opportunity of employment to local people. The quantity of *Moha* flower, *Moha* seed, gum, *hirda* collected is very meager when compared to its actual potentiality of the area. Proper co-ordination and control over MSCTDC and its sub-agents is essential. The collected materials are always purchased and smuggled to the neighbouring states through petty purchaser and traders from the weekly markets.

In **Tussar Planting Working Circle**, no considerable work was done and the traditional tussar growers managed the area and pollarded the natural *Ain* and *Arjun* crop in their own way. No tussar plantations were raised to reduce the pressure on naturally growing *Ain* and *Arjun* trees. The main aim of working circle could not be achieved due to apathy.

In **Wildlife (Overlapping) Working Circle**, no special measures were taken to protect, conserve and manage the wildlife in the area during the plan period. The population of the Tiger reduced from 4 to 0. The population of panther is also slowly dwindling. Herbivore animals are also shown in limited numbers during last census.

In **Bamboo (Overlapping) Working Circle**, all the commercial felling series were worked by the BILT and nistar felling series are departmentally worked. The overall working of bamboo is satisfactory.

B. EX-PROPRIETARY PROTECTED FORESTS:

5.2.37 A working scheme for this forest prepared by V.K. Prabhu has been under implementation since 1965-66. Prior to that year, these forests were not managed under any systematic or silvicultural basis. The history of management of jamindari forests may be considered in three periods as under:

- (i) The period of practically no control, up to 1886.
- (ii) The period of mild control, from 1886 to 1918
- (iii) The period of strict control from 1918 to 1951

6.2.38 During the first period, there was only a very general provision that the forests were to be managed according to such rules as Government might lay down from time to time. Some restrictions were placed over the cutting of valuable timber species such as *Teak*, *Bija*, *Shisham*, *Ain* etc. Contracts for extraction of timber were under the general control of the Deputy Commissioner of the district, whose sanction was also necessary for the grant of lease covering more than 1,000 trees of the reserved species and running into a term of more than one year.

6.2.39 The construction of railway-lines in the early eighties was a landmark in the history of the jamindari forests. Certain jamindari, particularly in Bhandara and Balaghat districts, fell easy pray in the tactics of unscrupulous contractors who were responsible for over exploitation and depletion of forest wealth. The government was obliged to take a very serious view of the state of affairs, and this led to the second period, a period of mild control.

6.2.40 A new set of rules was drawn up for the management of jamindari forest and was incorporated in the Land Revenue Act, 1889. The effective provisions of these rules were:

- (i) No shifting cultivation was to be permitted in the tract, which was prohibited by the Deputy Commissioner.
- (ii) In tracts especially reserved under the orders of the Dy. Commissioner, no timber was to be cut without the permission of the Dy. Commissioner.
- (iii) The Government was at liberty to take reserved tracts under direct management for such periods as it thought fit.

6.2.41 The new rules were in force for over a decade, but it was felt that they were also not very effective. Due to heavy demand of railway slippers, the forests were being recklessly cut. The position was most deplorable in Bilaspur

Jamindaris. It was at this time that a forest officer came into the picture. According to A.A. Dunber Brander, who was deputed to inquire the conditions prevailing in the jamindaris. The main difficulties in managing the jamindari forests were:

- (i) The absence of a definite forest policy.
- (ii) The non-recognition of the state and village forests.

6.2.42 The Revenue Officers themselves felt that owing to the lack of knowledge, they were unable to apply such powers of control and if they interfered, their efforts were nullified.

6.2.43 The third period starts with the enactment of the Central Provinces Land Revenue Act, 1917 (II of 1917). Section 202 of this Act and the rules made there under governed the management of the jamindari forests. The effective clauses of these rules were:

- (i) No trees of any species were to be cut removed or burnt for manufacturing charcoal, nor any of the following species of fruit trees were to be cut without previous permission of Dy. Commissioner.

Mango, Tamarind, Moha, Achar, Jamun, Harra, Beheda, Sindhi, Palmyra, Date and Sago palms and fruit bearing Tendu.

- (ii) No forest growth was to be cleared for cultivation within a radius of 1.5 miles from the limit of any municipal or notified area.
- (iii) When an application was made by the proprietor for cutting of any forest growth for extending cultivation, the Deputy Commissioner might refuse to grant the same if he considered that this is necessary in the public interest.
- (iv) Forest growth might be cut under proper sanction subjected to the following restrictions:
 - (a) No shifting cultivation should be carried out on the land.
 - (b) Atleast 30 seed bearing trees of the principal kind and a minimum of 90 evenly distributed trees, should be left per acre.
 - (c) All timber and brushwood should be cut flush with the ground level and no culm of bamboos less than two years old should be cut.
 - (d) No cutting should be done within 20 yards of either side of the bank of a stream.
 - (e) No lease or licence for unrestricted cutting should be given by the proprietor without the permission of the Deputy Commissioner.

- (f) The Deputy Commissioner might, at any time, suspend cutting, to investigate whether the operations were in accordance with the rules or not.

6.2.44 The Act also empowered the Deputy Commissioner to proclaim that the forest growth of the jamindari would be protected by the Government, if the proprietor or any other person was guilty of violation of the rules.

6.2.45 In about ten years, however, it was realized that even these new provisions (which were considered very strict when they were originally drawn) did not go very far. The Deputy Commissioner has neither the staff nor the expert to see that the protection and management of these forests was properly carried out. The Revenue authorities did not possess the specialized knowledge necessary to assess whether the forests were being harvested on correct lines or not.

6.2.46 An achievement of these rules, however, was drawn through simple working plans for some of the jamindari forests by qualified Forest Officers but the area covered was very small. The working plans were also primitive.

6.2.47 The abolition of proprietary rights in 1951 resulted in the jamindari forests vested in the State Government and it was necessary to amend the Revenue laws. Accordingly a new section, section 218-A, was inserted in the Land Revenue Act and rules were framed under the same.

6.2.48 The general policy of the State Government then, was to transfer large blocks of forests lands of the ex-jamindaris to the forest department for management, even if such land was burdened with Nistar rights. The forest department, in turn, took steps to get this forests notified as protected forests under the Indian Forest Act and started survey & demarcation for preparation of working plans or working schemes. During the period between 1951 to 1965, there was no forest management in protected forests due to the absence of rules. .

6.2.49 To sum up the past management upto 1951 and even beyond, the jamindari forests were administered under the Revenue Law and Rules made there under proved in effective mainly because they were executed by non-professionals. As a result, these forests were deprived of specific management. The protective aspect of forest management was entirely neglected. The rules made under Revenue Laws, at no stage provided for even elementary fire protection. The cumulative effect of the above was that the forests were seriously over harvested. Owing to the absence of protection there was also considerable ecological degradation. Preferred harvesting in the higher girth classes led to preponderance of younger age classes of valuable species forming admixture with *Moha*, *Salai*, *Tendu* etc.

6.2.50 In addition to the above harvesting for economic gains by the owner, these areas were also subjected to nistar extraction by the villagers. Quantity and method of extraction are also reasons for degradation. The resultant crop was crudely pollarded and malformed. Encroachment for cultivation was at a fast space

after the abolition of proprietary rights in 1951 and up to 1965-66. Incessant fires in the young coppice crop coupled with unrestricted grazing causes severe degradation of the area. There was heavy infestation of woody climbers in these areas.

THE WORKING SCHEME OF V.K. PRABHU (1965-66 TO 1974-75):

6.2.51 The then Government of Madhya Pradesh decided in a meeting held in June-1956 in Pachmadi, that all ex-proprietary forest areas transferred to the Forest Department should be scientifically managed to improve their condition and maintained their productivity in perpetuity. Accordingly, survey, demarcation and preparation of maps of these forests were started and working scheme units for preparing their management plans were sanctioned.

6.2.52 In accordance with the above decision, as well as subsequent decision of the forest department, a working scheme for the ex-proprietary forest of Kurkheda, Dhanora and Gadchiroli Ranges of East Chanda Forest Division was prepared for the period 1965-75 by V.K. Prabhu and submitted to the Govt. of Maharashtra in March 1964. After reorganization of East Chanda Forest Division in 1983 this scheme now covers the protected forest areas of Gadchiroli and Wadsa Forest Divisions. However, the present plan covers the forest areas of Gadchiroli Forest Division only.

6.2.53 The working scheme, which was to expire in 1974-75, has been accorded extension thereafter.

6.2.54 The ex-proprietary forest areas of Gadchiroli Forest Division, now spread over all the nine Ranges Viz. Gadchiroli, Chatgaon, Kunghada, Potegaon, Pendhari, North Dhanora, South Dhanora, East Murumgaon and west Murumgaon, were belonged to Gadchiroli and Dhanora ranges of East Chanda Forest Division covered by the Working Scheme of V.K. Prabhu. These areas today account for 169727.31 Ha. i.e. 77.36% of the total forest area of the division.

6.2.55 The main objects of management, prescribed under the Working Scheme were as follows:

- (1) To bring as much area as possible of ex-proprietary forests under scientific management.
- (2) To improve the health as well as the economic value of forests by preferential treatment as well as by plantations.
- (3) To satisfy local nistar demand from designated nistar areas and conserve, as far as possible, trees producing edible fruits and flowers.
- (4) To arrest and combat the menace of soil erosion by taking suitable measures and

- (5) To improve the productivity.

6.2.56 The method of treatment adopted for the scheme by Prabhu was influenced by the National Forest Policy (1952) guidelines and the subsequent decision of the then Madhya Pradesh Government in December 1952 regarding its implementation in the State which decided that State Forest should be classified in the following five categories for management purposes:

- (i) **PROTECTION FORESTS:** This included forests covering steep slopes (25 degree and above) occurring along riverbanks, and forests that had depleted through maltreatment. Further harvesting of this forest results soil erosion thereby endangering the agricultural lands in the lower regions. The management strategy for these areas was to conserve them.
- (ii) **TREE FORESTS:** Forests, which were predominantly suited for growing large sized timber and other products of commercial value, being located away from human settlements.
- (iii) **MINOR FORESTS:** Forests, which were interspersed with cultivation and were capable of producing small timber and firewood and providing grazing which are indispensable needs of the local population.
- (iv) **PASTURE LANDS:** Openly stocked forests or scrublands that had ceased to yield even small timber but which were conveniently suitable for providing grazing to the cattle.
- (v) **REMAINING FORESTS:** (a) Grass Reserves, which were in small blocks of forests situated amidst intensively cultivated tracts having scrubby growth, and capable of producing good fodder grasses (b) Recreation reserve which were needed for bio-aesthetic purposes (c) Forest villages etc.

6.2.57 The method of treatment of the categories (i), (ii) & (iii) are as follows -

- (i) **TREATMENT FOR PROTECTION FORESTS:** Most of the steep slopes liable to erosion, under stocked areas with density below 0.4, blank areas to a width of one chain would either be excluded from working or would be worked very lightly according to the necessity or providing them protection.
- (ii) **TREATMENT FOR TREE FORESTS:** The better quality forest having sufficiently dense with under storey of bamboos would be worked on Selection-cum-Improvement system. In addition, some of the inferior quality tree forests would also be worked on this system due to following reasons (a) Remoteness of these areas from human settlements (b) A concentrated system like the coppice with reserve would not be an economically viable for these interior areas and (c)

The main object of management of these areas was basically for the improvement of the crop.

6.2.58 However, “Tree forests” of inferior quality situated mostly near the human habitations in the plan would be worked under Coppice With Reserve System.

- (iii) **TREATMENT FOR MINOR FORESTS:** Forests around the villages where nistar zones had been formed were to be worked under Coppice With Reserve System on a reduced rotation, i.e. 20 years. The main object of this Minor Forest Working Circle was to meet the nistar demand of the villagers.

6.2.59 MISCELLANEOUS WORKING CIRCLE: An overlapping working circle was formed for bamboo working in which the felling cycle was of four years. Suitable areas were set apart for the Ballarpur Paper Mills Ltd.

6.2.60 Based on the above methods, the following working circles were formed.

- (i) Selection-Cum-Improvement Working Circle
- (ii) Coppice with Reserve Working Circle
- (iii) Minor Forest Working Circle and
- (iv) Bamboo (Overlapping) Working Circle

I. SELECTION-CUM-IMPROVEMENT WORKING CIRCLE:

6.2.61 The Selection-Cum-Improvement Working Circle contained good quality of miscellaneous forests, forests with dense bamboos and forests that were situated mostly on hills. The forests mainly belonged to Madhya Pradesh quality III often found intermingled with lower quality classes. The main object of management was the production of large sized timber of valuable species.

6.2.62 The areas included in this working circle was subjected to extravagant selective harvesting, uncontrolled fires and lack of operations for regeneration and tending during the jamindari regime. The forests under this Working Circle had mainly young to middle aged crops with a few mature and over mature trees. Hence the prescription for the working of forests were designated for the production of large sized timber, improvement of growing stock and increase in the production of economically valuable species by preferential treatment and by planting in a short period.

6.2.63 A rotation of 100 years was prescribed on the basis of growth data for teak of North Chanda Forest Division (old). Harvestable girths for the main species were prescribed as follows:

- *Teak* (121.92 cm.) *Bija* (137.16 cm.), *Ain* (137.16 cm.), *Shisham* (137.16 cm.), *Bhirra* (121.92 cm.), *Haldu* (137.16 cm.) and *Garari* (42.72 cm.). Based on the objects of management a felling cycle of 20 years was prescribed. The yield was regulated by area.

6.2.64 Teak was chosen as the most favoured species due to its commercial value. Other favoured species in order of importance were *Bija* (*Pterocarpus marsupium*), *Ain* (*Terminalia alata*), *Shisham* (*Dalbergia latifolia*), *Dhaora* (*Anogeissus latifolia*), *Haldu* (*Adina cordifolia*), *Tendu* (*Diospyros melanoxylon*) and *Bhirra* (*Chloroxylon swietenia*).

6.2.65 Areas unfit for working included precipitous and very steep slopes of 25 degree and above, under stocked areas with density below 0.4, areas liable to serious erosion and eroded areas one chain wide along the side of main water course and five chain wide stripes around tanks.

6.2.66 Suitable areas not less 25 acres or 10.11 ha of plantable area in extent at one place bearing predominantly miscellaneous crop and having deep well drained soil with gentle slopes were to be selected for teak plantations.

6.2.67 The marking rules prescribed are climber cutting over the whole coupe at the time of marking, preservation of trees for protection purposes, preservation of trees for seed production and lastly, preservation of healthy fruit trees, *Kulu* gum and *Khair* trees. Trees of all the marketable species were to be enumerated in 30 cm. girth classes.

6.2.68 In the selection felling, one in every two of mature trees above the prescribed sizes were to be marked for felling provided their retention was not necessary on the silvicultural grounds and for the soil conservation. Best trees were to be selected for retention. Trees in the pre-selection girth class were not to be marked for felling unless their removal was essential for improvement of the crop. Formation of permanent gaps was to be avoided.

6.2.69 In improvement felling, only dead, dying, or seriously deteriorating trees putting on negative increment, trees whose removal did not endanger the soil were considered for harvesting. Thinnings were prescribed, for the remaining areas having irregular crop and to be carried out in favour of *Teak*, *Bija*, *Ain*, *Shisham*, *Bhirra*, *Dhaora* and *Tendu* in order of importance. The canopy was to be kept sufficiently dense in order to keep the bamboo under check. All the weak and malformed advance growth of valuable species was to be cut back throughout the coupe at the time of marking. Trees of inferior species and bamboos interfering with the resultant coppice were to be removed provided such an action did not encourage the growth of grasses.

6.2.70 Every year at least 100 acres or 40.47 ha. of teak plantations per range were to be taken up on suitable sites and no plantation site admeasuring less than 10 Ha. of actual area are planted.

6.2.71 Subsidiary silvicultural operations like cut-back operations; cleaning and thinnings in plantations were also prescribed.

6.2.72 Miscellaneous regulations included fire protection, closure of coupes from grazing and plantations for 7 seven years after main felling. Areas to be worked under this working circle were to be closed under section 30 of Indian Forest Act, 1927 and thereby prohibiting villagers from exercising their nistar rights.

II. COPPICE WITH RESERVE WORKING CIRCLE:

6.2.73 This working circle included all the harvestable forests situated near the human settlements, where the forest growth was considered sufficiently dense and valuable harvesting is possible. Most of the areas included has inferior growth with scanty or no bamboos, and were considered suitable for the supply of small timber and firewood. The general quality of forests included in this working circle was Madhya Pradesh quality class IVa. Teak was scanty in occurrence and malformed in growth. The crop was characterized by the presence of a great variety of species, the most important of which were Ain (*Terminalia alata*), Bija (*Pterocarpus marsupium*) and Dhaora (*Anogeissus latifolia*). The main object of management of these forests was commercial production of timber, poles and firewood on sustained basis to the maximum possible extent. This object was considered to be the best for working these forests under Coppice With Reserve System. A rotation of 40 years was prescribed for this system with the aim that the trees reserved for production of big sized timber would be retained for two or more rotations. The yield was to be regulated by area.

6.2.74 Teak was again chosen to be the most favoured species. The other valuable species to be favoured included Bija (*Pterocarpus marsupium*), Semal (*Bombax ceiba*), Ain (*Terminalia alata*), Shisham (*Dalbergia latifolia*), Dhaora (*Anogeissus latifolia*) and Bhirra (*Chloroxylon swetenia*). These species were to receive preferential treatment in order of their importance in the selection of trees to be reserved, in subsidiary silvicultural operations and in thinnings. Trees bearing edible fruits and flowers were also to be reserved.

6.2.75 As regards marking, in the areas unfit for marking, only dead and over matured trees were to be marked departmentally. In all other areas the following trees were to be reserved.

- (1) Healthy trees bearing edible fruits and flowers used by the local population.
- (2) *Semal* trees below 4'-6" in girth at breast height over bark.
- (3) All good advance growth, except *Garari* up to 9" g.b.h. over bark.
- (4) All healthy trees of economic importance such as *Teak*, *Ain*, *Shisham*, *Tendu*, *Aola*, *Shivan*, *Tinsa* and *Bhirra* up to 24" in g.b.h. over bark. The number of trees to be reserved would depend upon the number of suitable trees available and not below 30 trees per acre as far as

possible. In areas of medium to low stocking all healthy trees, except *Garari* were to be reserved at the rate of 40 to 50 trees per acre. In addition to this, thinning was prescribed for the patches containing pole crops, all climbers were to be cut and all *Garari* was to be clear felled.

6.2.76 The subsidiary silvicultural operations included cut-back operations and cleaning.

6.2.77 The general miscellaneous regulations prescribed in the Selection-Cum-Improvement Working Circle were to be applied to the forest areas of this working circle as well.

III. MINOR FOREST WORKING CIRCLE:

6.2.78 This working circle comprised of forests around cultivation and occupied areas. All such forests were included in these working circles to be managed chiefly for meeting the nistar requirements of the local villagers. These areas had earlier been constituted into nistar zones in accordance with the guidelines given by the then Madhya Pradesh Government in June 1953. According to these guidelines if the tree clad area in a village was half of the total occupied area of the village, the village was to be considered self sufficient in nistar supply. These forests had been suffered considerable damage in the past due to indiscriminate felling, unregulated and unscientific harvesting for nistar by the local villagers. The main objects of management of forest coming under this working circle were (1) To provide nistar materials to the local villagers (2) To prevent indiscriminate felling by regulating fellings through simple felling rules for the removal of small timber and fuel for nistar.

6.2.79 The silvicultural system prescribed was coppice with reserve. The rotation was kept for 20 years. The agency for harvesting of coupes was to be Gram Panchayat, Gram Sabhas or Nistar panchayats or as decided by the Conservator of Forests, Chanda Circle.

6.2.80 The method of executing fellings was the same as prescribed for the coppice With Reserve Working Circle. The same set of rules for subsidiary silvicultural operations as in Coppice With Reserve Working Circle were to be applied to this Working Circle too.

6.2.81 Miscellaneous regulations included are fire protection, grazing, exercise of rights and concessions etc. It was provided that all the areas would be closed under section 30 of the Indian Forest Act, 1927. Nistar supply was to be made available only from the current year's working areas of this working circle, which if found insufficient, could be made good from other working circles by the Divisional Forest Officer.

IV. BAMBOO (OVERLAPPING) WORKING CIRCLE:

6.2.82 This overlapping working circle, included all the areas carrying bamboos in harvestable proportion. The only common species of bamboo occurring in these forests is *Dendrocalamus strictus* with very few scattered patches of Katang bamboos (*Bambusa arundinacea*) on nala banks.

6.2.83 There was sufficient growing stock of bamboos in these areas. Working of bamboos for nistar and commercial purposes was, however, totally unregulated and unscientific. The bamboo areas in the interior suffered from the absence of management rather than harvesting, and those in the vicinity of human habitations were subjected to irregular harvesting.

6.2.84 The local demand for bamboo was very limited as compared to the quantum available. In order to utilize the potential fully, the bamboo areas were grouped into nistar and commercial felling series, the former meets the local need and the latter meets the commercial requirements of Ballarpur Paper Mill. The commercial felling series were given lease to Ballarpur Paper Mill for the period of 30 years. The object of management of forest areas allotted to this working circle was scientific harvesting of bamboos for meeting the local as well as commercial needs. The felling cycle was of four years.

6.2.85 Felling rules governing the bamboo harvesting were as follows:

- (1) A clump having less than 10 culms was to be considered undeveloped and therefore, unfit for working.
- (2) No felling would be carried out during monsoons.
- (3) No culms below 2 years of age would be cut.
- (4) No dead, malformed, twisted or crooked culms would be left in the clumps.
- (5) No culm would be cut lower than 6" and higher than 18" from the ground level.
- (6) At least 8 matured well-grown culms would be maintained in the clump.
- (7) No rhizome would be dug out or damaged and
- (8) The retained culms would be spaced out in the clump.

SECTION- 3: ANALYSIS OF PRESCRIPTION, OTHER TECHNICAL AND ADMINISTRATIVE PARAMETERS:

6.3.1 As was the universal practice, the working plan/working schemes prepared during the period, were guided to a great extent by the National Forest Policy guidelines. Classification of forests into protection forest, tree forest, minor forest, pasture lands and remaining areas which more or less define the uses and

therefore, provided for geographically separated units, which was not followed while forming the working circles under these scheme. Protected forests were not separated out and kept under a separate working circle. The tree forests were divided into Selection-Cum-Improvement Working Circle and Coppice with reserve Working Circle on the basis of presence or absence of commercial value of trees. The inferior areas are allotted to Coppice with Reserve Working Circle. The minor forest-working circle comprised of tree forests around the human habitations belonging to both the previous working circles. Allotment of similar areas to different working circles and prescribing different technical prescriptions on the basis of uses and not on any technical basis was a shortcoming perhaps this must be because of the condition prevailing then.

6.3.2 The compartments formed, includes forest as well as non-forest areas such as, habitations, cultivations etc. with only outer boundaries demarcated. This gave rise to serious protection problems. The protected forests in the vicinity of the villages have, as a consequence of this, suffered from large-scale encroachments.

6.3.3 From coppice areas, which included areas of the Coppice With Reserve as well as Minor Forest Working Circles, many important timber species have diminished. These include Bija (*Pterocarpus marsupium*), Ain (*Terminalia alata*), Mokha (*Schrebera swietenoides*), Behada (*Terminalia bellirica*), Harra (*Terminalia chebula*), Bhirra (*Chloroxylon swietenia*), Khair (*Acacia catechu*), Semal (*Bambox ceiba*) as well as host of other species which are poor or no coppices or which coppice only up to a certain age. All the trees do not have the capacity to coppice and all those, which do have the capacity, do not exhibit the same capacity at all stages of their life cycle. Further in coppice areas post harvesting prescriptions should be strictly followed for the maintenance of proper shape, size and general health of trees. A preliminary survey of these forest areas maintained under the Coppice With Reserve System reveals that these areas have greatly suffered from lack of post harvesting care like fire protection as well as general protection. There is a preponderance of malformed trees. Absence of singling operations after the main felling has led to bushy growth. Lack of protection from illicit felling and grazing has led to not only denudation but also a virtual loss of natural regeneration over most of these areas.

6.3.4 The forest areas allotted to the Minor Forest Working Circle were part of the same compartments, which were allotted to the two main Working Circles i.e. Selection-Cum-Improvement and Coppice With Reserve Working Circles. The forest areas forming this working circle appears that these were not demarcated from the remaining forest areas, and the Forest Department never exercised control over these areas, the nistar supply was never regulated by the Divisional Forest Officer, and the Divisional Forest Officer was not even aware that these areas were under his control. As a result most of the areas have either been encroached or pattas have been allotted by the Revenue Authorities. The remaining areas had been severely degraded due to incessant and unrestricted harvesting for small timber, fuel and grazing. Prescribing a short rotation of 20 years for these areas was another step, which took into consideration, the need for fulfilling nistar demands rather than the need to manage these forests on scientific basis.

6.3.5 Forest areas belonging to the Gadchiroli Forest Division are mostly miscellaneous in composition with teak forests forming only a very small proportion i.e. 4.65 % of the total forest area. In such areas, the forest management should have favoured the dominant species in accordance with the principles of ecological succession and not teak which was nowhere near the list of dominant trees in majority of the areas. A preliminary survey of the plantation areas also suggested that teak plantation in most cases have suffered from poor survival and growth. More caution should have been applied for converting miscellaneous forests into teak plantations. The rotation of 100 years adopted for the Selection-Cum-Improvement Working Circle is also based on the age at which teak attains a girth of 4 feet 7 inches. The prohibitive price as well as extent of occurrence of teak in the area also indicates that a majority of local population was not accustomed to use teak for domestic purposes. The fact is that teak has increasingly become out of the reach of local population, which cannot afford to buy it, therefore, increase in area under teak would adversely affect people in supply of locally useful non-teak timber. Thus, large-scale teak is neither technically feasible nor socially acceptable.

6.3.6 At the time of preparation of the scheme and even today, almost all the ex-proprietary protected forests had been surveyed only on 1 inch to 1 Mile scale. Village maps were, however, available at 16 inches to 1 Mile scale. The requisite 4 inches to 1 Mile topo-sheets, essential for the preparation of stock maps, as well as the basic management maps, were not prepared by the Survey of India. V.K. Prabhu, therefore, had to resort to pantographic enlargement of 1 inch to 1 Mile sheets to the 4 inches to 1 Mile scale. The existing village maps of 16' = 1 Mile scale were reduced to 4 inches to 1 Mile scale and were superimposed on the enlarged topo-sheets. Forests compartments were laid down on maps prepared in this manner. Compartments included both the forests as well as non-forest areas. Analysis of maps, prepared at that time, reveals large-scale pantographic errors. None of the management maps depict longitudinal and latitudinal lines. Almost all the maps suffered from faulty directions, in the sense that the North-South direction on the maps does not tally with that depicted in the topo-sheets. As a consequence, the compartments laid down on the maps do not match with the direction of the topographical features on the topo-sheets. These have led to a lot of problems in the field specially at the time of laying out coupes, ascertaining forest boundaries, demarcating nistar zones etc.

6.3.7 The forests in general and Ex-proprietary Protected Forests in particular have suffered greatly from the onslaught of biotic pressure like illicit felling, encroachment, unregulated grazing and fire. The Government had formulated protection strategy for Protected Forests well ahead of the implementation of Working Scheme by issuing notifications under section 30 and 32 of the Indian Forest Act-1927 regarding the acts prohibited in the Protected Forests and the regulation of the acts permitted in these forests.

6.3.8 In the notification under section 30 of the Indian Forest Act, 1927 there are three clauses. (1) Section 30 (a) lists out the class of trees which are reserved (2) Section 30 (b) declares that certain areas would be closed for a period of 30 years and the nistar rights of private persons would be suspended during that period (3) Section 30 (c) lists out acts prohibited in Protected Forests which include quarrying of stones, the burning of line or charcoal, the collection or removal of any forest produce and breaking up or clearing for cultivation, for building and for herding cattle etc. Out of these three clauses only the clause (b) had a time limit of 30 years, which expired on 25th January 1988. The remaining two clauses are perpetual and without any time limit, it appears that all the other provisions of section 30 and 32 have expired on 25th January 1988.

SECTION 4: PAST YIELD AND REVENUE:

6.4.1 The following are the production figures in respect of forest produce, reproduced on the basis of sale results from 1993-94 to 2005-06.

Table No.-23

Past Yield

Sr.No.	Year	Forest Produce		
		Timber in Cum.	Firewood- Beats	Tendu Leaves in Std.Bags
1	1993-94	1364.111	7687.50	67459.943
2	1994-95	1165.255	1369.80	67513.443
3	1995-96	2606.279	40123.10	68947.123
4	1996-97	2956.027	31610.00	69762.922
5	1997-98	3483.056	20575.80	52070.787
6	1998-99	7093.926	19053.075	63191.305
7	1999-00	3902.783	18096.915	74226.610
8	2000-01	4074.874	25264.475	75436.112
9	2001-02	1368.002	5688.527	72329.039
10	2002-03	572.284	1411.85	71872.045
11	2003-04	4841.08	31738.21	67777.409
12	2004-05	5789.91	36943.55	51694.815
13	2005-06	--	--	45473.355

Table No.-24

Past Revenue

Sr. No.	Year	Revenue Realised in Lakhs.
1	3	4
1	1993-94	859.78
2	1994-95	1517.69
3	1995-96	692.47
4	1996-97	832.10
5	1997-98	656.53
6	1998-99	992.59
7	1999-00	626.62
8	2000-01	984.92
9	2001-02	665.04
10	2002-03	392.07
11	2003-04	518.10
12	2004-05	814.28
13	2005-06	578.06

6.4.2. The out-turn and revenue realized by FLCS during the last ten years in Gadchiroli Division, are given in Appendix No.LVIII of volume II.

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CHAPTER – VII

STATISTICS OF GROWTH AND YIELD

SECTION:1 STATISTICS OF RATE OF GROWTH OF TEAK AND MISCELLANEOUS SPECIES

7.1.1. Study has been conducted with regard to the growth of teak and khair in Gadchiroli Forest division and the statistics pertaining to the growth and development of teak & khair is reproduced hereunder.

GROWTH OF TEAK:

7.1.2. STEM ANALYSIS: Teak tree of site qualities II & III from Gadchiroli & North Dhanora Ranges were selected and stem analysis was conducted during the Revision of Plan for Gadchiroli Division. The results of stem analysis are reproduced below and also given in Appendix-LXXVII of Volume II.

Table No. –25

Table showing the results of stem analysis: Teak site quality-II

Age in Years	Height in mt	D.B.H. (O.B.) in cm.	G.B.H.(O.B) in cm.	Stem timber volume in cum
3	1.37	3.8	11.93	0.01
13	4.24	6.3	19.78	0.018
23	7.24	11.4	35.80	0.10
33	10.24	18.1	56.83	0.31
43	13.24	24.93	78.19	0.67
53	16.24	32.24	101.23	1.09
63	19.24	38.8	121.83	1.57
73	22.24	45.2	141.83	2.01
83	26.40	53.3	167.36	2.52
93	27.56	62.1	195.00	2.99
103	28.34	68.77	215.96	3.31
113	29.34	75.45	236.92	3.63
117	29.84	77.45	243.20	3.75
119	30.35	79.45	249.48	3.81

From the above table following conclusions can be drawn.

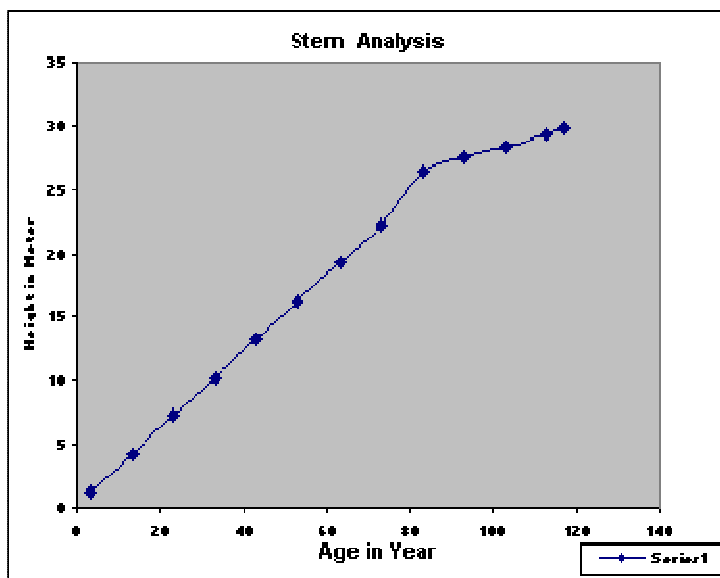
- i) The area is capable of growing sound trees up to 30.35 Mt. in height and 79.45 cmt. DBH (OB) in 119 years.

GROWTH STUDIES OF TEAK IN GADCHIROLI DIVISION:

Grow studies of teak for site qualities II & III and Khair for site quality III has been conducted by selecting trees in Gadchiroli and North Dhanora ranges through stem analysis. The results are given in the form of data and graphs.

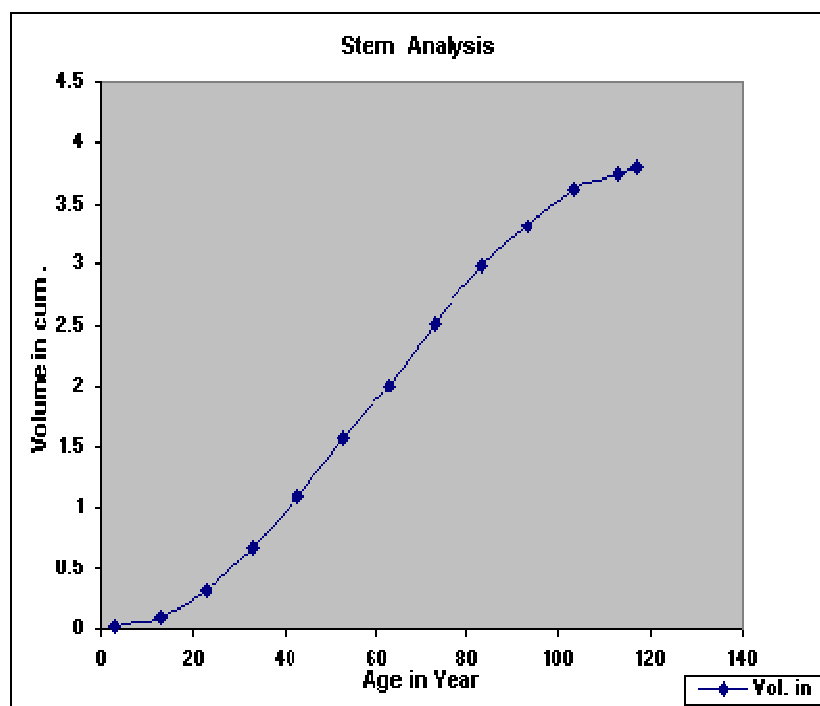
Stem Analysis
Teak -Site Quality II
Age/Height Curve
Division-Gadchiroli

Age	Height (Mt)
3	1.37
13	4.24
23	7.24
33	10.24
43	13.24
53	16.24
63	19.24
73	22.24
83	26.4
93	27.56
103	28.34
113	29.34
117	29.84
119	30.35



Stem Analysis
Teak -Site Quality II
Age/Volume Curve
Division-Gadchiroli

Age	Vol. in cum.
3	0.01
13	0.018
23	0.1
33	0.31
43	0.67
53	1.09
63	1.57
73	2.01
83	2.52
93	2.99
103	3.31
113	3.63
117	3.75
119	3.81



STEM ANALYSIS

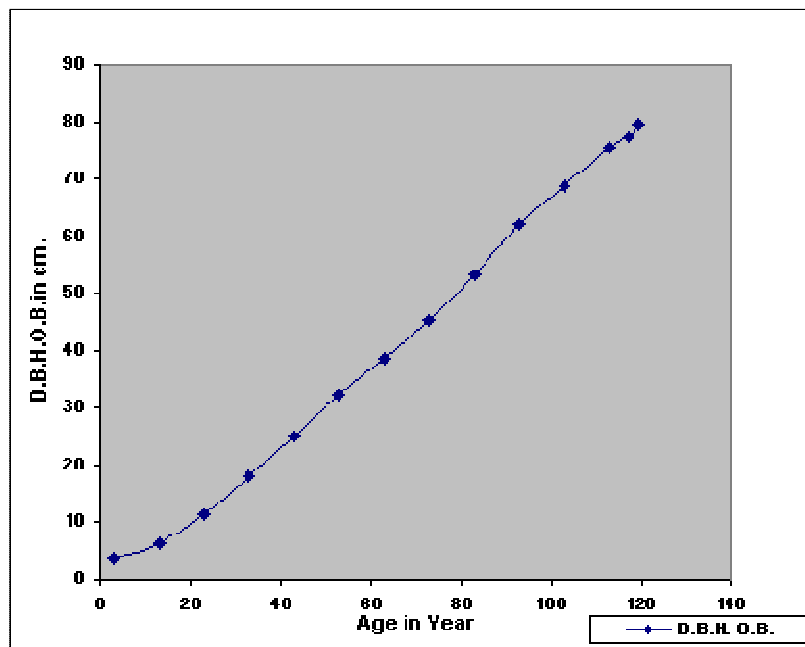
Diameter O.B./ Age Curve

Species : Teak

Site Quality II

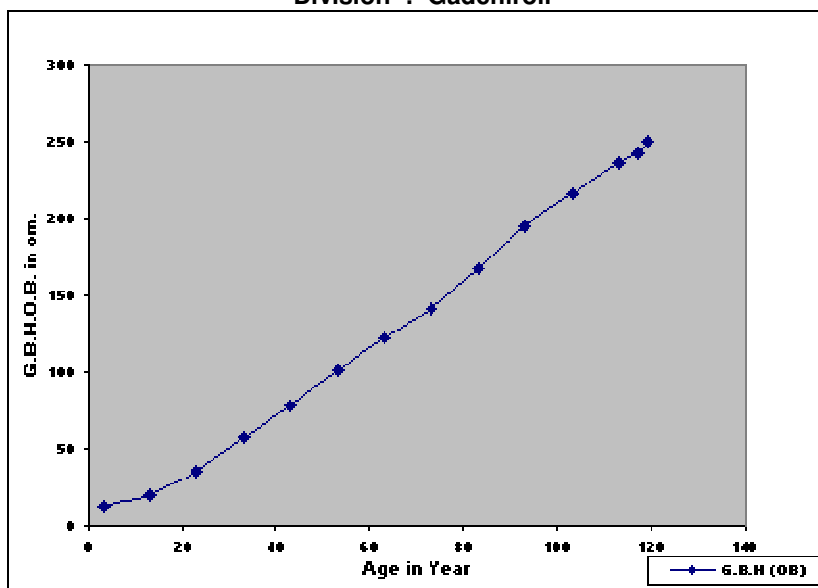
Division : Gadchiroli

Age	D.B.H. O.B.
3	3.8
13	6.3
23	11.4
33	18.1
43	24.9
53	32.24
63	38.8
73	45.2
83	53.3
93	62.1
103	68.77
113	75.45
117	77.45
119	79.45



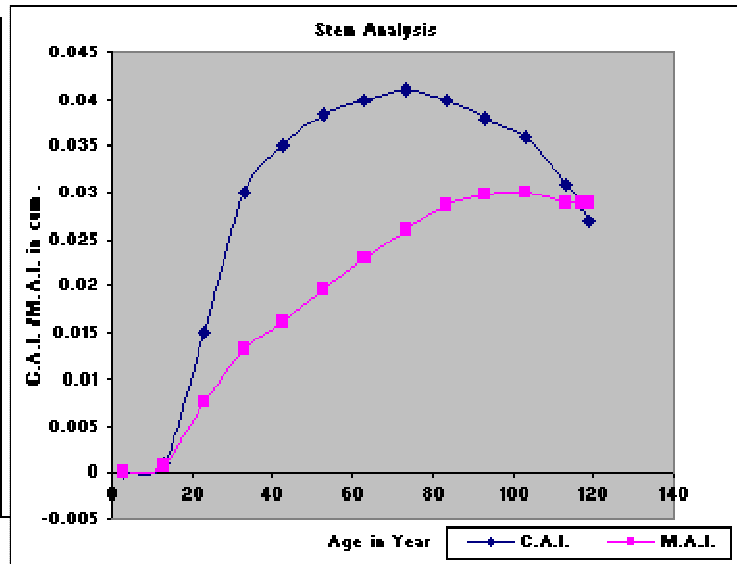
Stem Analysis Teak- Site Quality II Curve G.B.H. O.B. / Age Division : Gadchiroli

Age	G.B.H (OB)
3	11.93
13	19.78
23	35.8
33	56.83
43	78.19
53	101.23
63	121.83
73	141.83
83	167.36
93	195
103	215.96
113	236.92
117	243.2
119	249.48



Stem Analysis
Teak -- Site Quality II
C.A.I. / M.A.I. Curve
Division : Gadchiroli

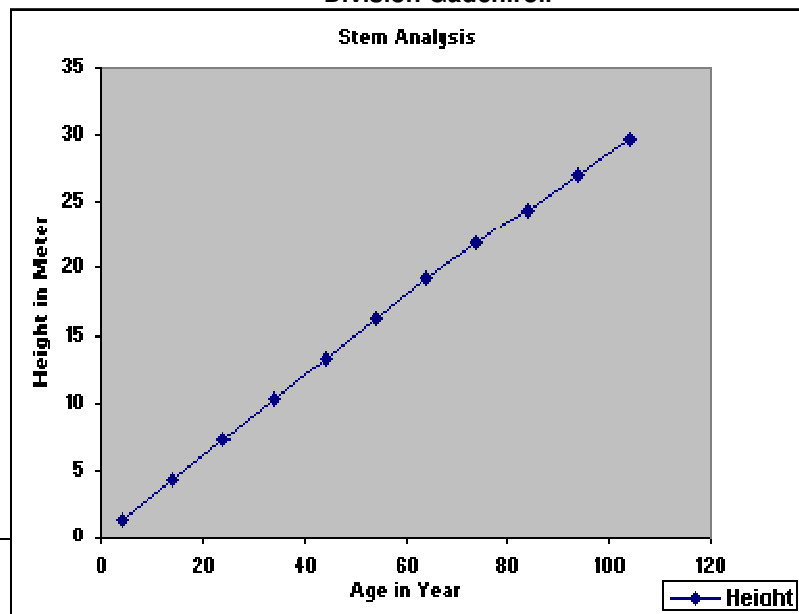
Age	C.A.I.	M.A.I.
3	0	0
13	0.001	0.00069
23	0.015	0.0075
33	0.03	0.0133
43	0.035	0.0161
53	0.0385	0.0197
63	0.04	0.023
73	0.041	0.026
83	0.04	0.02863
93	0.038	0.02973
103	0.036	0.03
113	0.031	0.029
117	0.029	0.029
119	0.027	0.029



C.A.I. & M.A.I. curves intersect each other at the age of 116 years which corresponds to G.B.H. (O.B.) 241 Cm.

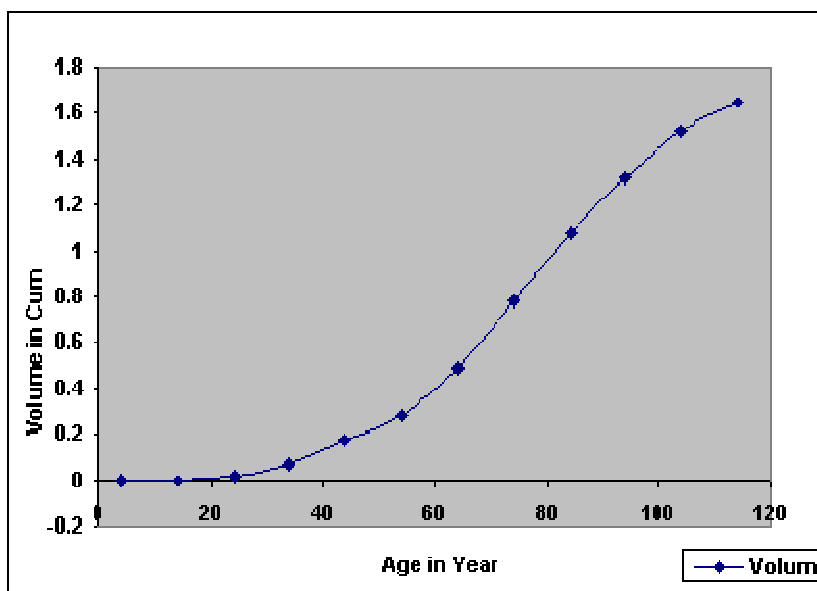
Stem Analysis
Teak- Site Quality III
Age/Height Curve
Division Gadchiroli

Age in year	Height in Meter
4	1.37
14	4.24
24	7.24
34	10.24
44	13.24
54	16.24
64	19.24
74	21.84
84	24.44
94	27.04
104	29.64
114	32.49



Stem Analysis
Teak -Site Quality III
Age/Volume Curve
Division Gadchiroli

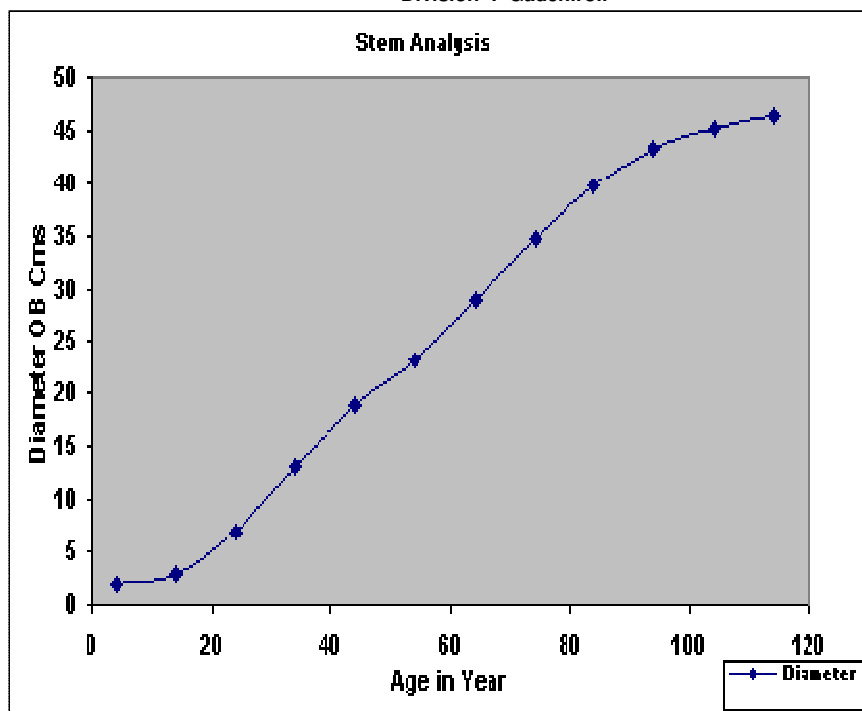
Age in year	Volume in cum
4	0
14	0.00065
24	0.01309
34	0.07119
44	0.17396
54	0.28131
64	0.48903
74	0.77915
84	1.07282
94	1.32
104	1.52
114	1.65



STEM ANALYSIS

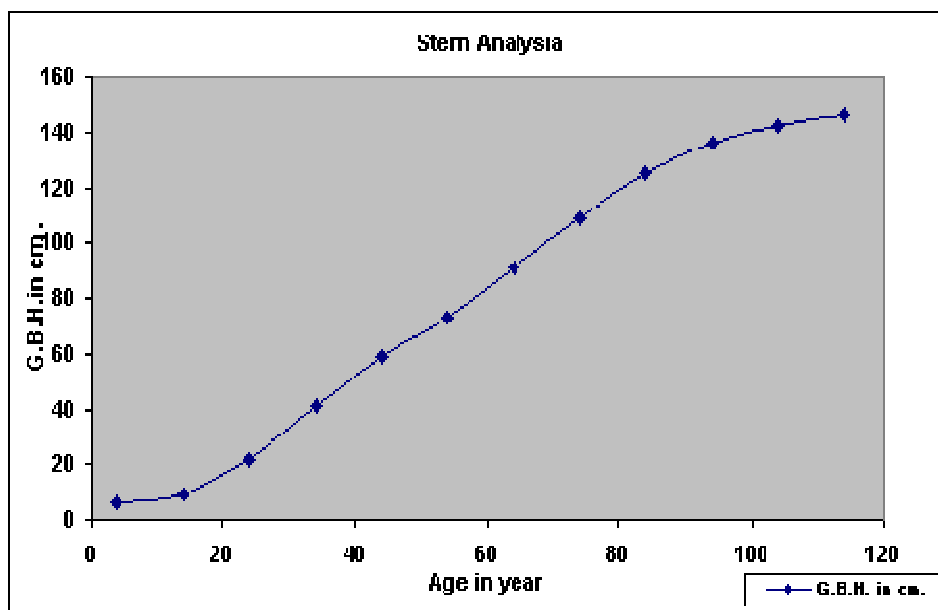
Diametar O.B./ Age Curve
 Species : Teak
 Site Quality III
 Division : Gadchiroli

Age	Diameter in cm .
4	1.9
14	2.86
24	7
34	13.06
44	18.79
54	23.25
64	28.98
74	34.71
84	39.8
94	43.31
104	45.22
114	46.5



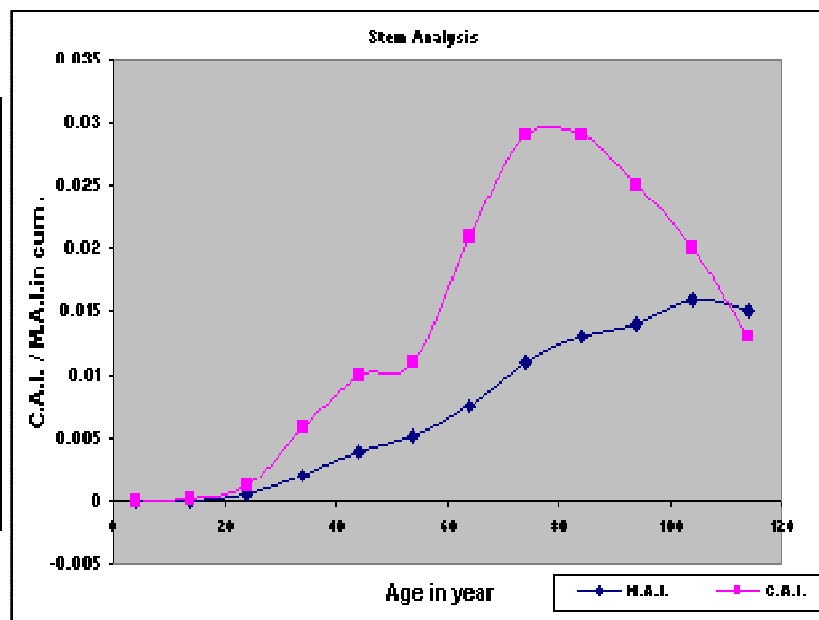
Stem Analysis
Teak- Site Quality III
Curve G.B.H. O.B. / Age
Division : Gadchiroli

Age	G.B.H.
	in cm.
4	6
14	9
24	22
34	41
44	59
54	73
64	91
74	109
84	125
94	136
104	142
114	146



Stem Analysis
Teak - Site Quality III
C.A.I. / M.A.I. Curve
Division : Gadchiroli

Age	M.A.I.	C.A.I.
4	0	0
14	0.000046	0.000065
24	0.000545	0.0012
34	0.00209	0.0058
44	0.004	0.01
54	0.0052	0.011
64	0.0076	0.021
74	0.011	0.029
84	0.013	0.029
94	0.014	0.025
104	0.016	0.02
114	0.015	0.013



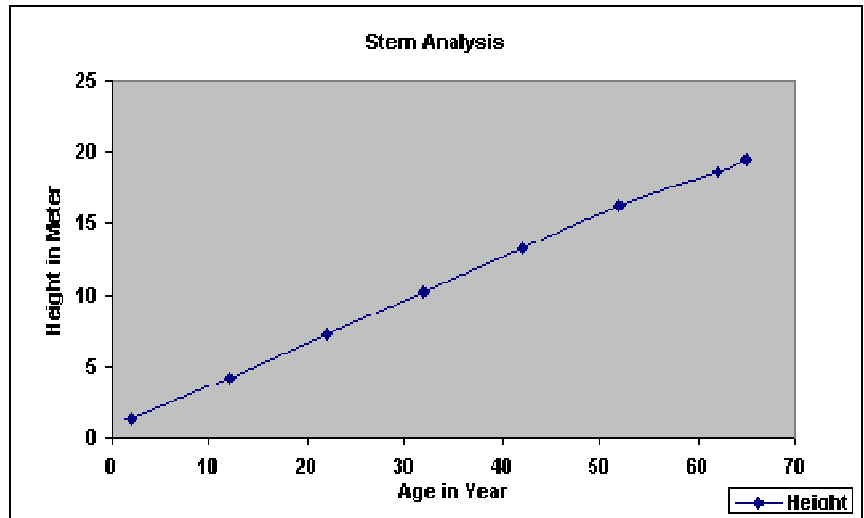
C.A.I. & M.A.I. curves intersect each other at the age of 110 years correspondence, to G.B.H. (O.B.) 140 Cm. which falls within girth class 135-150. Hence harvestable girth is fixed at 135 cm.

7.1.3 GROWTH OF KHAIR:

Analysis of growth of Khair (Stem Analysis) has been carried out in compartment no.561, North Dhanora Range of Gadchiroli Division and the related data regarding Age-Height, Age-volume, GBH (OB)/Age, DBH (OB) Age, CAI-MAI, have been calculated and results of stem analysis are reproduced below and also given in Appendix-LXXVII of volume II.

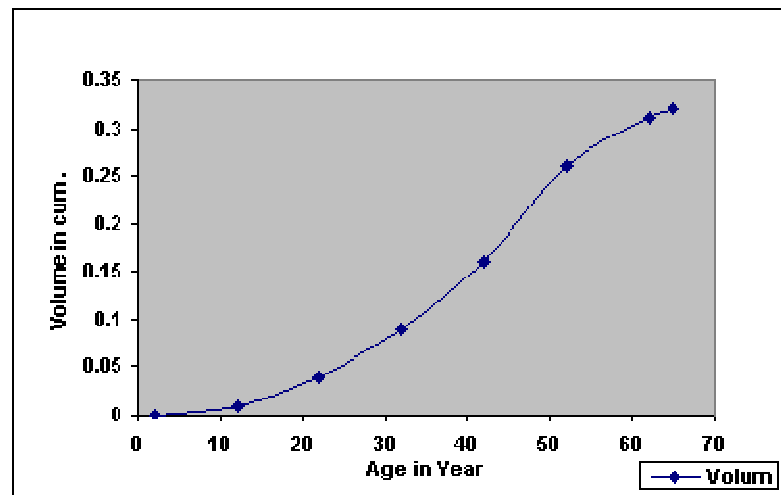
Stem Analysis
Khair - Site Quality III
Age / Height Curve
Division : Gadchiroli

Age	Height
2	1.37
12	4.24
22	7.24
32	10.24
42	13.24
52	16.24
62	18.65
65	19.55



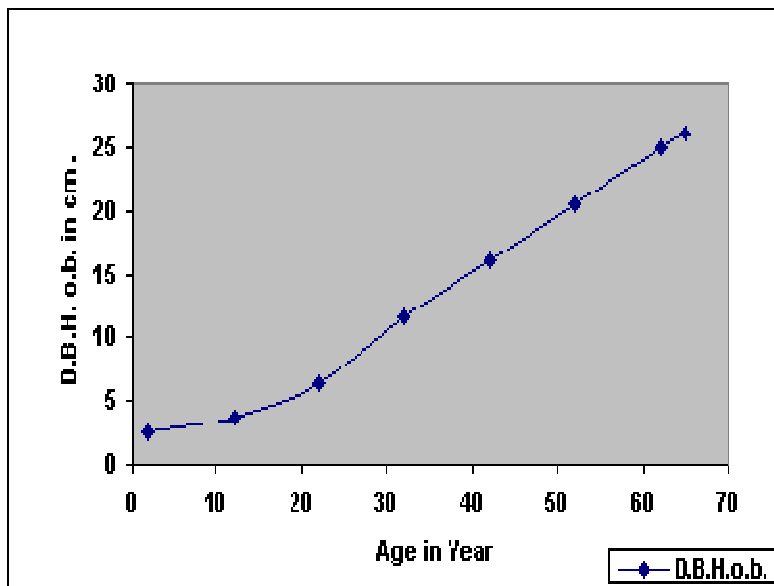
Stem Analysis
Khair - Site Quality III
Age / Volume Curve
Division : Gadchiroli

Age	Volume
2	0
12	0.01
22	0.04
32	0.09
42	0.16
52	0.26
62	0.31
65	0.32



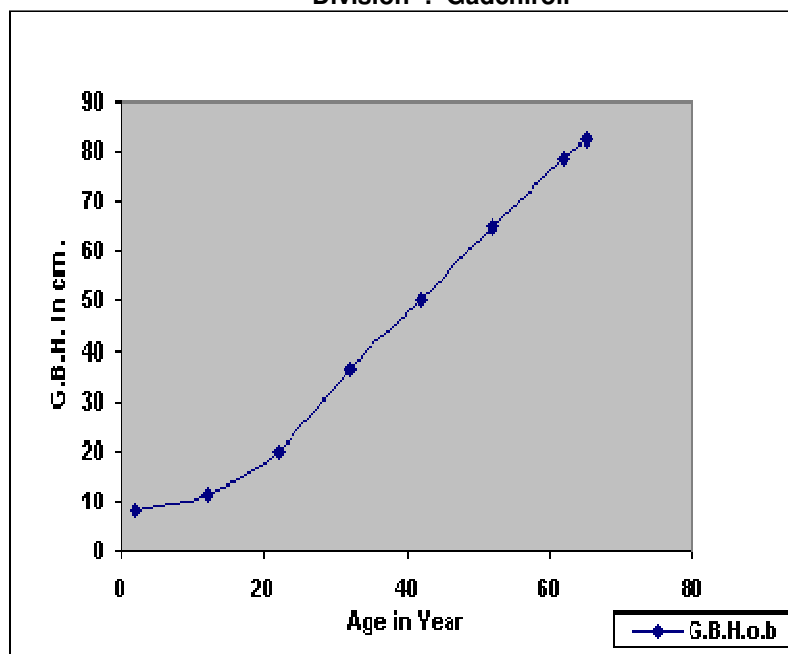
Stem Analysis
Khair Site Quality III
D.B.H. O.B. / Age Curve
Division : Gadchiroli

Age	D.B.H.o.b.
2	2.5
12	3.6
22	6.4
32	11.6
42	16
52	20.6
62	25
65	26.2



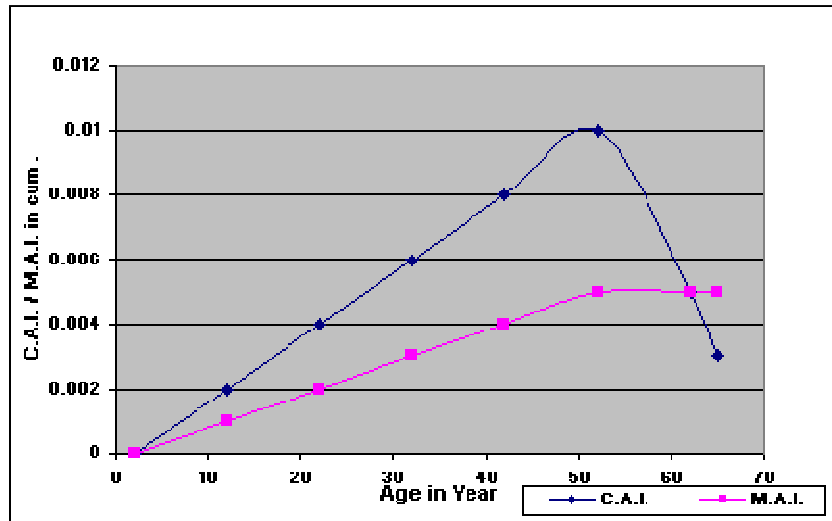
Stem Analysis
Khair - Site Quality III
Curve G.B.H. O.B. / Age
Division : Gadchiroli

Age	G.B.H.o.b
2	7.85
12	11.3
22	20.09
32	36.42
42	50.24
52	64.68
62	78.5
65	82.26



Khair Site Quality III
C.A.I. / M.A.I. Curve
Division : Gadchiroli

Age	C.A.I.	M.A.I.
2	0	0
12	0.002	0.001
22	0.004	0.002
32	0.006	0.003
42	0.008	0.004
52	0.01	0.005
62	0.005	0.005
65	0.003	0.005



C.A.I. & M.A.I. Curves meet each other at the age of 62 years, correspond to gbh (o.b.) 78 c.m. which falls within girth class of 75-90 cm. Hence harvestable girth is fixed at 75 cm.

SECTION – 2 ESTIMATION OF GROWING STOCK

7.2.1. (I) GENERAL VOLUME TABLE:

Forest Survey of India has conducted the Forest Resources Survey of Ballarshah catchment areas during 1971-75. During this survey from the data of felled trees of teak and miscellaneous species the volume was calculated and on the basis of which general volume equations were derived for the species for which felled tree data of at least 30 trees were available. Data of rest of the species were pooled together and one equation was derived for them.

The following types of regression equations were tried:

- i) $V = a + b D^2 H$
- ii) $V/D^2H = a + b/D^2H$
- iii) $V = a + b D^2 H + c (D^2H)^2$
- iv) $\text{Loge } V = a + b \text{ Loge } D + cd \text{ Loge } H$
- v) $V/D^2 = a + b/D^2 + cH^2$

Where V = Volume (in cum under bark) up to 5 cm top over bark diameter.
 D = Diameter (in m) at breast height (1.37 m from ground)
 H = Height in meters.

7.2.2. Since the tract dealt with comes within Gadchiroli catchment, the general volume and local volume equations derived by them are reproduced as follows

7.2.3. The following general volume equations were selected taking into consideration, the standard error of the estimate, the multiple determination coefficients, applicability of the equation and meaningful interpretation of the equation for different species:

Table No. -26

S.N.	Species	General Volume Equations
1	Tectona grandis(37)	$V/D^2H = 0.30446 - 0.0023/D^2H$ for $D^2H < 1.5$
2	Terminalia alata(41)	$V = 0.08758 + 0.24432 D^2H$ for $D^2H > 1.5$ $V = 0.00012 + 0.20302 D^2H$
3	Pterocarpus marsupium(42)	$V = 0.03611 + 0.33714 D^2H$
4	Diospyros melanoxylon(34)	$V/D^2H = 0.38217 - 0.00856/D^2H$
5	Anogiessus latifolia (30)	$V = 0.00931 + 0.38507/D^2H$
6	Phyllanthus emblica (23)	$V = 0.0124 + 0.34322 D^2H$
7	Lagerstroemia parviflora(26)	$V/D^2H = 0.35949 - 0.00088/D^2H$
8	Boswellia serrata (36)	$V/D^2H = 0.36068 - 0.00761/D^2H$
9	Lannea Coromandelica(33)	$V = 0.35751 D^2H$
10	Madhuca latifolia (43)	$V/D^2H = 0.36089 - 0.00951/D^2H$
11	Buchanania lanzan	$V = 0.01475 + 0.29820 D^2H$
12	Cleistanthus collinus	$V = - 0.00185 + 0.32352 D^2H$
13	Rest of species (111)	$V/D^2H = 0.33352 + 0.00042/D^2H$

7.2.4. Figures in brackets after the name of species denote the number of trees on which the equations are based.

7.2.5. On the basis of the above equations the general volume tables prepared for some mentioned species has been given in the **Appendix –XV of Volume II.**

7.2.6.(II) LOCAL VOLUME TABLE :

Forest survey of India, during their survey, volume of each sample tree was estimated using the general volume equation selected for a species. Taking this volume as dependent variable and the diameter at breast height (1.37 m above ground level) or its function as independent variable. The following types of regression equations were tried:-

$$\begin{aligned}
 V &= a + bD^2 \\
 V &= a + bD + cD^2 \\
 V &= a + bD + cD^2 + dD^3 \\
 \sqrt{V} &= a + bD \\
 V/D &= a + b/D + cD \\
 V/D &= a + b/D + cD + dD^2 \\
 V/D^2 &= a + b/D^2 & V/D^2 &= a+b/D^2+c/D \\
 V/D^2 &= a+b/D^2+c/D + dD & \text{Loge } V &= a + b \log_e D
 \end{aligned}$$

7.2.7. The following local volume equations were selected for different species taking into consideration the same criteria as for general volume equations:

Table No. -27

S.N.	Species	Local Volume Equations
1	Tectona grandis(30)	$\sqrt{V} = - 0.106720 + 2.562418 D$
2	Terminalia alata(266)	$V/D = - 0.397340 + 0.011283/D + 4.704700D + 2.369640 D^2$
3	Pterocarpus marsupium(59)	$V = 0.107059 - 1.010240D + 7.685670 D^2$
4	Diospyros melanoxylon(140)	$V/D = - 0.975148 + 0.033867/D + 8.255412D$
5	Anogiessus latifolia (112)	$V/D = - 0.36762 - 0.006854/D + 4.5577D + 5.25567D^2$
6	Phyllanthus emblica (49)	$V/D^2 = 5.000428 - 0.013485/D^2$
7	Lagerstroemia parviflora(39)	$\sqrt{V} = - 0.130340 + 2.824203 D$
8	Boswellia serrata (38)	$V/D = - 2.641645 + 0.153684/D + 15.056400D - 6.2061 D^2$
9	Lannea Coromandelica(44)	$\sqrt{V} = - 0.138286 + 2.729368D$
10	Madhuca latifolia (78)	$V = 0.074069 - 1.23002D + 7.726902D^2$
11	Buchanania lanzan (67)	$V = - 0.00767 + 0.2654D + 1.0385 D^2 + 7.527 D^3$
12	Cleistanthus collinus (320)	$V = - 0.019404 + 3.802027 D^2$
13	Rest of species (402)	$V/D = - 0.610255 + 0.020853/D + 6.10823D + 0.637781 D^2$

Where V = volume in cum.

D = DBH in meter.

7.2.8. Figures in brackets after the names of species denote the number of observations on which the equations for the species are based.

7.2.9. The local volume table for some species with the help of above regression equations were prepared during the preparation of this plan which has been given in **Appendix – XVI of Volume II.**

7.2.10 III) TREE ENUMERATION:

7.2.11

1% strip sampling method has been adopted for tree enumeration. The enumeration works have been started by the SOFR unit Chandrapur in the year 2003-04 under the supervision of Dy. Conservator of Forest, Working Plan Division No.1, Chandrapur. The statement showing the number of stems per ha with distribution of stems of some important species and girth classes has been given below.

spp	15-30	31-45	46-60	61-75	76-90	91-105	106-120	121-135	136-150	151& up	Total
Ain	9.96	7.46	5.76	5.35	5.31	4.34	3.55	2.43	1.71	1.90	47.77
Aonla	1.94	2.36	2.00	1.46	0.99	0.46	0.21	0.08	0.02	0.02	9.54
Beheda	3.04	3.10	2.50	1.84	1.31	0.99	0.59	0.36	0.25	0.31	14.29
Bija	1.26	1.80	1.78	1.98	2.10	2.11	1.87	1.46	1.04	1.29	16.69
Char	5.81	5.42	3.84	2.32	1.10	0.47	0.20	0.06	0.03	0.01	19.26
Dhaoda	8.74	6.30	4.55	4.06	3.27	2.41	1.61	0.97	0.51	0.43	32.85
Garadi	38.07	29.23	19.07	11.87	6.65	2.87	1.04	0.32	0.12	0.06	109.30
Khair	2.61	2.61	1.41	0.69	0.33	0.10	0.07	0.01	0.01	0.00	7.84
Lendia	10.86	6.71	3.83	2.44	1.59	0.79	0.38	0.16	0.07	0.05	26.88
Moha	3.20	2.22	1.73	1.49	1.52	1.32	1.22	1.08	0.68	1.33	15.79
Mowai	1.70	1.88	1.87	1.84	1.70	1.41	1.03	0.56	0.35	0.25	12.59
Shisham	0.56	0.74	0.81	0.73	0.61	0.35	0.20	0.09	0.05	0.06	4.20
Shiwan	0.43	0.89	0.46	0.23	0.18	0.10	0.07	0.07	0.05	0.02	2.50
Surya	3.84	3.51	2.99	2.13	1.29	0.64	0.27	0.11	0.06	0.02	14.86
Teak	6.44	4.96	3.34	2.11	1.56	1.15	1.01	0.59	0.35	0.40	21.91
Tendu	9.28	4.00	2.45	2.14	1.88	1.51	1.18	0.70	0.43	0.55	24.12

The object of the survey was to assess the local growing stock of all species. All the species were enumerated separately in 15 cm. girth classes down to 15 cm gbh.

7.2.11. SAMPLING PLAN:

The felling series was taken as unit and the strip sampling method is being followed for enumeration. The intensity of sampling in the Reserve Forest as well as in Protected Forests has been taken as 1 % of the growing stock.

7.2.12. (IV) EXISTING GROWING STOCK (CUBICAL CONTENTS):

Working Circle wise growing stock per ha. has been given in **Appendix No. XVII of Volume II.**

SECTION - 3: YIELD**7.3.1. COMMERCIAL VOLUME TABLE:**

Commercial volume table which is in practice in Central Chanda Forest Division prepared by collecting data from the worked coupes and given in the working plan of Rajura, is reproduced below:

Table No. -28

Girth class In cm	Timber in cum	Firewood (Solid volume)	Total volume in cum
15 - 30	0.014	--	0.014
30 - 45	0.028	--	0.028
45 - 60	0.070	--	0.070
60 - 75	0.110	0.060	0.170
75 - 90	0.165	0.090	0.255
90 - 105	0.220	0.120	0.340
105 - 120	0.310	0.175	0.485
120 - 135	0.400	0.230	0.630
135 - 150	0.485	0.330	0.815
150 & above	0.570	0.430	1.000

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CHAPTER - VIII

WILDLIFE PRESERVATION

SECTION –8.1: DISTRIBUTION OF WILDLIFE:

8.1.1. The Forests of Gadchiroli Division are not rich in wild fauna. One of the major factors contributing to the depletion of wild fauna in the past was perhaps indiscriminate shooting for pleasure and food during the zamindari regime. Hunting by local tribals also contributed in the decline of wildlife even in the interior hilly areas. Apart from indiscriminate shooting, poaching & hunting, the population explosion and economic developments have led to the severe degradation of natural habitat of wildlife. The food, water and shelter, the basic needs of the wild animals have become scarce in plain areas. The common wildlife found in the tract is as under.

CARNIVORA:

8.1.2. (i) Tiger (*Panthera tigris*) :- This animal is found in dense plain forests and sheltered valley areas. In summer they are mostly confined to wooded banks of big rivers and areas in vicinity of stagnant pools of bigger streams.

8.1.3. (ii) Panther (*Panthera pardus*) :- It is commonly known as Bibat. It is more common than tiger and inhabits in forests closed to human habitations.

8.1.4. The other Carnivores found in this tract dealt with are Jungle Cat (*Felis chaus*), Jackal (*Canis aureus*), Striped Hyena (*Hyena hyena*), Fox (*Vulpes bengalensis*), Sloth Bear (*Melursus*), Wild Dogs (*Cuon alpinus*) etc.

8.1.5. HERBIVORA:

The herbivorous animals found in this tract are Sambar (*Corvus unicolor*), Chital (*Axix axis*), Nilgai (*Boselaphus tragocamelus*), Wild boar (*Sus cristatus*), Sloth bear (*Melursus ursinus*), Barking deer (*Muntiacus muntjak*), Langur (*Prebytis entellus*), Indian Hare (*Lepus ruficaudatus*) and Common Mongoose (*Harpestes edwardsi*).

8.1.6. AVIFAUNA:

The commonly seen birds are Pea fowls (*Pavo cristatus*), Jungle fowls (*Gallus sonnerataii*), Quails (*Coturnix coromandelicae*), Partridges (*Francolinus pondicerianus*), Cranes (*Grus antigone*), Ducks (*Casarca rutila*), Snipes (*Capella galianus*), Green pigeon, Crows, Tites, Babblers, Bulbuls, Robins, Fly catchers, Shrikes, Drongos, Warblers, Myna, Weaver birds, Munias, Buntings, Wagtails, Cuckoos, Parakeets, Bee-eaters, King fishers, owls, Vultures, Doves, Egrets etc.

SECTION –8.2: PAST MANAGEMENT OF WILDLIFE & ITS RESULTS:

8.2.1 Prior to the abolition of proprietary rights in 1951, there existed no rules for regulation of hunting in these forests. Killing of animals for pleasure as well as for the pot was common.

8.2.2 Subsequent to the abolition of proprietary rights in 1951, the then M.P. Government framed rules for regulating shooting in the village forests in the year 1953.

8.2.3 Subsequently when these forests were notified as Protected Forests under section 29 of Indian Forest Act, 1927, the management of wildlife came to be regulated as per the rules framed under section 32 (J) of the Act together with the prevalent rules under C.P. and Berar Games Act, 1935 and the Game Block Rules as specified in M.P. Forests Manual Volume No.II.

8.2.4 In October 1961, the Government of Maharashtra clarified that the rules framed under the Bombay Wild Animals and Wild Birds Protection Act, 1951 would be made applicable to the Vidharbh region with effect from June, 1961. That Act was superseded by the wildlife (Protection) Act, 1972, which came into force from 1st June 1973. Hunting of animals has been completely banned, and the shooting permission was given to the cultivators during the harvesting season to shy away the wild boars.

8.2.5 Explosion of human population, encroachment and human settlements, improved road network, better means of transport and higher range weapons have proved to be a considerable threat to the wildlife. Commercial trade of wildlife products and poaching have adversely affected the wildlife as well as their habitats.

SECTION–8.3:LEGAL POSITION:

8.3.1. The provisions under Berar Forest Law, 1886, amended in 1891 were in vague and there was no separate Act for wildlife. In the year 1911 vide notification No. G.I.F.D. No. 2197-1-B, 13th October 1911 the Indian Forest Act, 1878 was made applicable. The section 2 (b) (iii) included the wildlife in its definition of the forest produce. Under section 25 (1) of the said act any person in contravention of any rules which the local government may time to time prescribe, shall be punishable with imprisonment for a term which may extend up to 6 months or with fine not exceeding Rs.500/- or with both, in addition, compensation for damage done to the forests as the convicting Court may direct to be paid.

8.3.2 Prior to reorganization of state the wildlife conservation was through the implementation of the provisions of the Indian Forest Act, 1927 and the shooting rules framed under section 26(I) and 76(d) by Ex-Madhya Pradesh Government as given in Appendix – VIII of M.P. Forest Manual, Vol.-II, combined with the Wild Birds and Animals Protection Act, 1912 as amended Central Provinces Amendment Act of 1935. From 1927 shooting block system was started.

Under this system the Conservator of Forests in consultation with the Dy. Conservator of Forests, declared certain blocks of Reserved Forests with abundant game as shooting blocks. The Divisional Forest Officer used to issue permits for shooting.

8.3.3 Shooting permit was granted to the specific kind and number of animals. After hunting of permissible limit of game animals, particular shooting block was given rest by keeping it closed for hunting. Licences issued for guns for crop protection after 1936 increased illicit shooting in the vicinity of villages. Indian Forest Act, 1927 and Shooting Rules framed there under offered no protection to the wildlife outside the Reserved or Protected Forests.

8.3.4. After reorganization of states in 1956, the Bombay Wild Animals and Wild Birds Protection Act, 1951 was extended to Vidarbha Region with effect from 1/6/1961. Though this act did not propose a significant change in the management of game in Reserved and Protected Forests yet it was important as it operated in areas outside the Reserved and Protected Forests also. Under the provisions of this Act arms licence holders for sports were required to register themselves with the Wildlife Preservation Officer. This Act prescribed a closed season for hunting and classified the game into four categories viz-small game, big game, special big game and pet animals. It also sought to control transaction of trophies and other wildlife products. The statutory wildlife Advisory Board was constituted under this Act, to advice the Government on various important matters concerning wildlife.

8.3.5. The Indian Board of Wildlife was constituted in 1952 with the main object of conservation and development of wildlife through coordinated legislative measures and making recommendations and setting up of National parks, Sanctuaries and other protected areas. A comprehensive and unified National and State Park Act, 1971 was passed which provided for appointment of an "Advisory Committee" to advice in constitution and declaration of National Park and Sanctuaries and formulation of administrative policy. The parliament then enacted the wildlife (Protection), Act, 1972, which came into force in Maharashtra State w.e.f. 1st June, 1973 vide Government of India, Ministry of Agriculture (Department of Agriculture) Notification No. GSR/F-11014/3/72-FRY/WLP, dated 1st June, 1973. On the commencement of this Act, any other Act relating to any matter contained in this Act and in force in the State, stood repealed. The subsequent rules made under the Act are as follows:-

- (i) The Wildlife (Stock Declaration) Rules, 1973 (became effective in Maharashtra w.e.f. 1st June, 1973).
- (ii) The Wildlife (Transaction and Taxidermy) Rules, 1973, (became effective in Maharashtra w.e.f. 1st June 1973
- (iii) Wildlife (Protection) Rules, 1975 (became effective w.e.f. 6th March, 1975.
- (iv) The Wildlife (Protection) Licensing (Additional Matter for consideration) Rules, 1983 (became effective w.e.f. 13th April, 1983).

- (v) The Wildlife Protection Act was amended to be called as Wildlife (Protection) Amendment Act, 1986 and it came into force w.e.f. 25th November 1986.

8.3.6. In 1991, the Central government has further amended the Wildlife (Protection) Act (The wildlife (Protection) Amendment Act, 1991), which came into force w.e.f. 2nd October 1991.

8.3.7. The wildlife (Protection) Act, 1972 is a piece of comprehensive legislation which provides for effective protection and preservation of wildlife restriction on hunting and regulation of trade of articles made out of wild animals.

8.3.8. Hunting of wild animals is strictly prohibited under this Act unless it is specially permitted. Wild animals have been categorized in six schedules and animals included in schedule-I and part II of schedule-II received the privilege of strict protection. Animals specified in these schedules are permitted to be hunted with special permission if they are dangerous to human life or property or they become disabled or diseased beyond recovery.

8.3.9. Animals specified in schedule-II (Part-I), III & IV were prohibited from hunting, except under and in accordance with specific licence issued under the Act or it had become dangerous to human life or property or had become diseased or disabled beyond recovery. Only vermin included in Schedule-V had been excluded from strict protection.

8.3.10. Hunting of young and female of any wild animals other than vermin, or any deer with antlers in velvet is strictly prohibited unless specially permitted (Section-15). The Act specifically requires declaration to be furnished by the individuals as well as trophies etc in their control, custody or possession.

8.3.11. The Government of India, vide letter dated 18th September 1975 stated that the control over tanks and rivers in National Parks and Sanctuaries should be vested with management authorities and not with the fisheries or irrigation department.

8.3.12. Government of India, vide letter No. 1 E-11011/3/75/FRY-9-(WLF) has clarified that the certificate of legal procurement to be issued by the Chief Wildlife Warden is not necessary where an animal is not included in any schedule of the Wildlife (Protection) Act, 1972. The Ministry of Commerce will regulate the export.

8.3.13. Subsequently, the delegation of power and duties of the Chief Wildlife Warden to the Police Sub-Inspector for the purpose of section 41(1) and section 55 of the Wildlife (Protection) Act, 1972 was granted by Government Resolution No. WLP-1973/197578-FI dated April 5th, 1976.

8.3.14. The schedules are revised by the Government as it was required under section 61 of the Wildlife (Protection) Act, 1972. The Government of Maharashtra, under section 64 of the Wildlife (Protection) Act, 1972, framed Rules

vide letter No.WLP-1679/95507/F-5. These Rules were amended further from time to time by the Wildlife (Protection), Maharashtra Rules, 1975.

8.3.15. The wildlife Protection Act was again amended to be called as Wildlife (Protection) Amendment Act, 1986 and it came into force from November 25, 1986. Under Section-44 of the Wildlife (Protection) Act, 1972, the Government vide letter No.WLP/1682/100208/CR-43 (1)/F-5 permitted the trapping of cobra and Russell vipers by a licenced dealer for the purpose of extracting venom. Under the power conferred under sub section (1) and sub section (2) of the section 64, the Government of India vide letter no. WLP/1682/10020(iii)/F-5 framed the new rules called Wildlife (Frog Leg Industry) Rules, 1987 and it came into force from November 25, 1987. The Government of India vide letter no. F-No.1-2/91/WL/1,dated 21st October 1991 further amended the Wildlife (Protection) Act, 1972. The following are the important amendments.

- (a) The plants have also been included under the purview of this Act.
- (b) The zoo and circus have been defined and included under this Act.
- (c) The word game reserves has been dropped.

8.3.16. Section 9 of Wildlife (Protection) Act, 1972 has been amended and there is a total prohibition of hunting of animals specified in schedule I, II, III & IV except as provided under section 11 and 12.

8.3.17. The following are the restrictions on hunting as per section 17 of Wildlife (Protection) Act, 1972. The following acts are prohibited, i.e.

- (i) Hunting of any wild animal, by means of a wheeled or mechanically propelled vehicle on water or land or by aircraft.
- (ii) Use of mechanically propelled vehicle for the purpose of driving or stampeding any wild animal.
- (iii) Use of chemical, explosive, pitfalls, poisons, poisoned weapons, snares or traps, except in so far as they relate to the capture of wild animals under a Wild Animal Trapping Licence.
- (iv) Hunting of special game or big game other than with a rifle, unless specially authorized by the licence.
- (v) Setting fire to vegetation for the purpose of hunting.
- (vi) Using artificial light for the purpose, of hunting except when specially authorised to do so under a licence in the case of carnivores.
- (vii) Hunting during night, except when specially authorized.

- (viii) Hunting of any animals on water holes or a saltlick or other drinking places or on path or approaches to the same, except water birds and sand-goose.
- (ix) Hunting any wild animal on any land not owned by the Government without the consent of the owner, or his agent or lawful occupier of such land.
- (x) Hunting during closed period as per section 16.
- (xi) Hunting with the help of dogs, any wild animals, except water bird, chakor, partridge or quail.

8.3.18. In 1991, the Government of India has passed the Wildlife (Protection) Amendment Act, 1991, which came into force with effect from October 2, 1991, except the Sections 35, 44, 55(c), Chapter III A and Chapter IVA. The salient features of this amended Act in brief are as follows.

- (i) The words “game reserves, big game and small game” have been omitted from the Act.
- (ii) Hunting the wild animals specified in Schedule I, II, III and IV of the Act has been banned, except as per the provisions of sec.11.
- (iii) A new chapter III-A has been introduced for the protection of specified plants. The specified plants have been included in a new schedule.
- (iv) Section 29 of the Act has been amended and like National Parks no wildlife can be exploited or removed from a Sanctuary too. This means all concentrated felling and collection of minor forest produce from Sanctuaries would be stopped.
- (v) A new section has been added in the Act to provide that no new arm licences shall be issued within radius 10 km of a Sanctuary without prior concurrence of the Chief Wildlife Warden of the state.
- (vi) A ban has been imposed on dealing with the imported ivory and articles made there from.
- (vii) A new chapter, IVA has been introduced to provide for central Zoo Authority and recognition of zoos.
- (viii) Commercial felling and exploitation of wildlife (Flora and Fauna) has been banned in Wildlife Sanctuaries just as it is in National Parks.
- (ix) The penalties for wildlife offences have been enhanced substantially. Section 39 of the Act has been amended to the effect that vehicles, vessels, weapons, traps, or tools, which have been used for committing

an offence and have been seized shall become the property of the Government.

- (x) Section 48A has been introduced which provides for restriction on transportation of wildlife i.e. no person shall accept any wild animals (other than vermin) or any animal article, or any specified plant or its part or derivative thereof, for transportation except after exercising due care to ascertain that permission from the Chief Wildlife Warden or any other officer authorized by the State Government in this behalf has been obtained for such transportation.
- (xi) Trade of imported ivory and products carved from it have been banned with effect from 2nd April 1992. Even their display in commercial establishments has been banned.
- (xii) Section 61(I) of the Act has been amended and now the power to make any change in the schedules of the Act vests only with the Central Government.

SECTION – 8.4: RIGHTS AND CONCESSION:

8.4.1. No rights and/or privileges are granted to any person over wildlife. But a member of scheduled tribe can, subject to the provision of Chapter IV of Wildlife (Protection) Act, pick, collect or possess in the district he resides any specified plant or part or derivative thereof for his bona-fide personal use. However, permits can be granted by the Chief Wildlife Warden, with prior approval of the State Government, for the special purposes like education, scientific research and collection of specimens for recognized Zoos, Museums and similar Institutions.

SECTION –8. 5: INJURIES TO WHICH THE WILDLIFE IS LIABLE:

(A) HUMAN AGENCIES:

8.5.1(i) Poaching:

Poaching of wild animals is a common phenomenon in this tract. The local population has the habit of hunting since Jamindari regime. This resulted in depletion of wild fauna in the tract. The local tribals generally kill the wild animals for pot. However, poaching of Tiger and Panther is done for their skins and bones. The wild animal and wild birds are illegally killed for its meat, skin, antlers and other trophies. Poachers usually shoot animals on water holes at the time of sunset when the animals visit them for drinking water. Nets or traps are also used for trapping birds, hares, antelopes and deers.

8.5.2.(ii) Fire :

Forest fire is of very common occurrence in this tract. The entire forests burn every year. Even the remote areas, which are the ideal habitat for wildlife also burn annually. The fire damages the natural habitats and drives the

wild animals towards human habitation to take shelter and thereby they are made prey to the poachers and local villagers.

8.5.3.(iii) Encroachment and illicit cutting:

Due to large scale encroachment and illicit cutting in the vicinity of human settlements the natural habitat of wildlife have been destroyed. The process is continuing and leads to shrinkage in the natural habitat of wildlife.

(B) OTHER AGENCIES:

8.5.4. Grazing:

There is a steep rise in the cattle population. Further, due to mass encroachment and deforestation, forests have been deteriorated and thus grazing pressure has been increased manifolds. The incidence of grazing is beyond the carrying capacity in plain areas compared to hills. Heavy grazing causes damage to the natural habitat of wildlife.

8.5.5 SCARCITY OF WATER:

Most of the streams except few rivers dry during summer. Therefore the wild animals experience acute water scarcity in summer and have to visit only a few water holes. This makes the villagers and poachers easy to kill the wildlife.

SECTION-8.6: OTHER MEASURES ADOPTED FOR PROTECTING WILDLIFE:

8.6.1. Besides the legal provisions under the Wildlife (Protection) Act, 1972 amended from time to time and the various rules made there under, following measures are also being adopted to protect the wildlife.

8.6.2. As per the provisions contained in Government Resolution's No. WLP/1570/224482-X-II, dated 30th September 1971, No. MSC-1071/113554/F-I, dated 25th March 1977, and No. WLP/1579/6200/4/F-I, dated 29th May, 1979, compensation is to be paid to the owners whose cattle is killed by tiger in the forest area. Vide G.R.No.WLP/1576/116974/F-5, dated 22nd August 1984, these provisions were extended for the cattle killed by panther also and also cattle kill by tiger or panther outside the forest area. Later these provisions have been extended for few more wild animals.

8.6.3. Provision has been made for payment for compensation in case of death or injury to human life by wild animals vide G.R. No. WLP/1002/CR-258/F-1, dated 17th January, 2003. As per this G.R compensation in case of death or permanent disability of a person has been increased to Rs.200000/- and to Rs.100000/- in case of a minor (below 18 years of age). In case of serious injury the compensation is Rs. 50000/- and in case of minor injury it is Rs. 7500/- per injured person. Statement showing the number of cattle and human being killed by various

wild animals and compensation given during last ten years has been given in **Appendix –XIX of Volume II**. Crop compensation to the farmers whose crops have been damaged by wildlife is also paid as per G.R.No. WLP-1094/CR-115/F-1 dt. 23.8.2004 and G.R.No.WLP-1004/C.R.219/F-1 dated 2.6.2006. The details of the government resolution/ circulars in this regard are given in the **Appendix –XLIX of Volume II**.

8.6.4. In 1972, with a view to check illicit shooting of wild animals, the State Government sanctioned the grant of reward to the informers in respect of unlicensed shooting, provided that the information is found to be valid and leads to conviction of the offender.

8.6.5. Besides the above-mentioned legal provision for protection of wildlife, public awareness for protection and preservation of wildlife is being created through the Wildlife Week, which is being celebrated from 1st to 7th October every year since 1951.

SECTION-8.7: GENERAL MEASURES SUGGESTED FOR THE PROTECTION CONSERVATION AND DEVELOPMENT OF WILDLIFE:

8.7.1. The general measures suggested are as follows.

- (i) The area should be strictly and effectively protected from fire.
- (ii) To keep vigilant watch on poachers/villagers.
- (iii) Water holes , which provide water to wild animals during summer, should be kept under constant watch.
- (iv) Informers should be promptly rewarded
- (v) Salt licks should be developed.
- (vi) Shelter and hiding places should be developed at required places.
- (vii) Construction of bunds, anicuts, forest tanks etc. on nalas at suitable places should be carried out for providing permanent water holes to the wild animals.

Census of Tiger/Panther in Gadchiroli Division

Name of Division	Name of the Animal	Year of Census				
		1989	1993	1997	2001	2005
Gadchiroli	Tiger	4	3	3	0	0
	Panther	9	8	6	3	6

CHAPTER – IX

ESTIMATE OF CAPITAL VALUE OF FORESTS

SECTION – 1: - TANGIBLE AND INTANGIBLE BENEFITS:

9.1.1.IN TERMS OF TANGIBLE BENEFITS:

Since the market rates for timber and firewood and also the production and extraction cost is increasing every year an attempt has not been made to find out the exact capital value of the forests in terms of rupees. However, the existing growing stock per hectare is already discussed in detail in the chapter VII.

9.1.2.IN TERMS OF INTANGIBLE BENEFITS:

As the forests are depleting fast, the intangible benefits of the forests are getting more and more important day by day. During an unique research done in the Banaras University, it is found that a single tree of about **fifty years age** is worth: -

I. Exhales oxygen worth	Rs. 2.50 lakh
II. Inhales CO ₂ and thus purifies air worth	Rs. 5.00 lakh
III. Prevents soil erosion worth	Rs. 2.50 lakh
IV. Regulates water supply worth	Rs. 3.00 lakh
V. Provides shelter to wildlife worth	Rs. 2.50 lakh
VI. Causes synthesis of proteins worth	Rs. 0.20 lakh
	<u>Rs. 15.70 lakh</u>

9.1.3. Thus from a middle aged tree we get intangible benefits worth about Rs. 15.70 lakhs. It is also estimated that well stocked woodland on one-hectare area absorbs 3.70 tons of Carbon dio-oxide from atmosphere and gives about 2.5 tons of life sustaining oxygen.

9.1.4. As per the guidelines issued by the Government of India in the Ministry of Environment, Forest and Wildlife vide No. 11-6/85/FRY (Cons.),dt. 13th January, 1986 regarding cost benefit analysis for de-reservation of forestland under Forest Conservation Act, 1980, they have given a thumb rule as follows: --

One ha of fully stocked forest (Density = 1.00)

- a. Avoids soil erosion,
- b. Affects hydrological cycle,
- c. Provides wildlife habitat,
- d. Improves micro climate, and
- e. Maintains ecological balance

Worth Rs.126.74 lakhs to accrue over a **period of 50 years**. This shows the tremendous value of the forests.

SECTION-2 : NET PRESENT VALUE OF GADCHIROLI FORESTS:

THE NET PRESENT VALUE OF GADCHIROLI FORESTS HAS BEEN CALCULATED WORKING CIRCLE-WISE & GIVEN BELOW.

SELECTION-CUM-IMPROVEMENT WORKING CIRCLE:

Total Area	- 103556.14 Ha.
Density	- 0.5 to 0.9
Per Ha. Cost	- 9.20 lakhs
Net present value	- 9,52,716.48 lakhs.

IMPROVEMENT WORKING CIRCLE:

Total Area	- 76108.13 Ha.
Density	- 0.4 to 0.6
Per Ha. Cost	- 7.76 lakhs
Net present value	- 5,90,599.08 lakhs.

AFFORESTATION WORKING CIRCLE:

Total Area	- 27867.04 Ha.
Density	- less than 0.4
Per Ha. Cost	- 6.56 lakhs
Net present value	- 1,82,807.78 lakhs.

SILVI-PASTURAL DEVELOPMENT WORKING CIRCLE

Total Area	- 10425.96 Ha.
Density	- below 04
Per Ha. Cost	- 6.56 lakhs
Net present value	- 68,394.24 lakhs.

TUSSAR WORKING CIRCLE:

Total Area	- 572 Ha.
Density	- below 0.4
Per Ha. Cost	- 6.56 lakhs
Net present value	- 3752.32 lakhs.

Total N.P.V. of Gadchiroli Forests - 17,96,589.43 lakhs. Approx. Rs. 17,966 Crores

The above calculations are according to Government Resolution given below:

Government GR.No.FLD 1002/CR-199/F-10, Dt. 17.12.2003
Net Present value of Forest.

As per Quality & Density of Forests

REFER TO LETTER NO.D-17/N.CEL/RS/2822, DT.16.3.2002

Category – I Forests (Conservation, Selection and Protection Working Circle)

Density Scale	Up to 0.5	Above 0.5
Rs.in Lakhs	9.00	9.20

Category – II Forests (Coppice with Reserve Working Circle, improvement working circle)

Density Scale	0.4 & above	0.5	0.6 & above
Rs.in Lakhs	7.76	8.33	8.90

Category – III Forests (Plantation, Development Working Circle & other remaining categories)

Density Scale	0.1 & above	0.2	0.3	0.4	0.5	0.6 & above
Rs.in Lakhs	5.80	6.18	6.56	6.94	7.32	7.70

Sd/-
 Under Secretary
 to Government Revenue & Forest Department
 Mantralaya, Bombay-400 032

=000=

PART –II

FUTURE MANAGEMENT DISCUSSED

AND

PRESCRIBED

CHAPTER – I

BASIS OF PROPOSALS

SECTION – 1.1: NATIONAL FOREST POLICY:

1.1.1. National Forest Policies for India were enunciated in the years 1894, 1952 and 1988. The changes in the policy were brought out depending upon the prevalent national needs and public requirements both local and general.

1.1.2. FOREST POLICY 1894 FOR INDIA:

This policy was enunciated in the year 1894 vide Resolution No. 22-F, dated October 19, 1894. As per this policy the forests were to be administered solely for the benefit of the public both at local and general. The outstanding principles of the policy were mainly as under:

- (i) The preservation of climatic and physical conditions of the country was the foremost.
- (ii) The preservation of minimum amount of forest necessary for the general well being of the country was the second.

On fulfillment of the above two conditions, the other priorities were as under.

- a) Cultivation to be given priority over forestry,
- b) Satisfaction of the needs of the local people, free or at non-competitive rates to be given priority over revenue.
- c) Realization of revenue to the greatest possible extent.

1.1.3. NATIONAL FOREST POLICY OF 1952:

Since the enunciation of 1894 policy, considerable developments of far reaching importance had taken place in the economic and political fields. The part played by forests in maintaining the physical conditions of the country came to be better understood. The country had passed through two world wars, which disclosed unsuspected dependence of defence on forests. The reconstruction schemes, such as river valley projects, development of industries and communications, were dependent heavily on forest produce.

1.1.4. Taking into consideration the changes which took place in the physical, economic and political fields during the intervening period, the forest policy, was reoriented in 1952, vide Government of India in Food & Agriculture,

Resolution No.(Agri) 13-1-52, dated 13-5-1952. It was based on six paramount needs of the country, namely:

- I. The need for evolving a system of balanced and complementary land use, under which each type of land is allotted to that form of use under which it would produce most and deteriorate least.
- II. The need for checking: -
 - (a) Denudation in mountainous regions, on which depends the perennial water supply of the river system whose basins constitute the fertile core of the country.
 - (b) The erosion that is progressing apace along the treeless banks of the great rivers leading to ravine formation and on vast stretches of undulating wastelands depriving the adjoining fields of their fertility.
- III. The need for establishing tree lands, wherever possible for the amelioration of physical and climatic conditions, promoting the general well being of the people.
- IV. The need for ensuring progressively increasing supplies of grazing, small wood for agricultural implements and in particular of firewood to release the cattle dung for manure to step up food production.
- V. The need for sustained supply of timber and other forest produce.
- VI. The need for the realization of the maximum annual revenue in perpetuity, consistent with the fulfillment of the needs enumerated above.

1.1.5. The National Forest Policy further stated that while observing these general principles, in paramount National interest the discretion of State Govt. to regulate the forest administration in their respective territories is left unfettered to enable them to frame their policies and legislation for conserving and utilizing the forest resources, provided that the declared forest policy of state does not impinge adversely upon the general economy and physical balance of an adjoining State and that it is in consonance with the general principles underlying the forest policy laid down by the Center for the preservation and development of the Nation's forest resources which are so vital to its general well being.

1.1.6. NATIONAL FOREST POLICY OF 1988:

Over the years, forests in the country suffered serious depletion because of relentless pressures arising from ever increasing demand for fuel wood, fodder and timber, inadequacy of protection measures, diversion of forestlands to non-forestry purposes without ensuring compensatory afforestation and essential environmental safeguards and the tendency to look upon forests as revenue earning resources. With a view to mitigate the above problems, a new forest conservation policy based on preservation, maintenance, sustainable utilization,

restoration and enhancement of the natural environment, was enunciated in December 1988.

1.1.7. The basic objectives governing the new National Forest Policy of 1988, are as under: -

- (i) Maintenance of environmental stability through preservation and restoration of the ecological balance that has been adversely disturbed by serious depletion of the forests of the country.
- (ii) Conserving the National heritage of the country through preservation of natural forests, which are abundantly rich in variety of flora and fauna with a remarkable bio-diversity and genetic resources of the country.
- (iii) Checking soil erosion and denudation in the catchment areas of rivers, lakes and reservoirs in the interest of soil and water conservation, for mitigating flood and droughts and for retardation of siltation of reservoirs.
- (iv) Increasing substantially the forest/tree cover in the country through massive afforestation and soil conservation programs, especially on all denuded, degraded and un-productive lands.
- (v) Meeting the requirements of fuel wood, fodder, minor forest produce and small timber to the rural and tribal population.
- (vi) Increasing the productivity of forests to meet essential National needs.
- (vii) Encouraging efficient utilization of forest produce and maximizing substitution of wood.
- (viii) Creating a massive people's movement with the involvement of women, for achieving these objectives and to minimize pressure on existing forests.

1.1.8. The forest policy further states that, in the management of the existing forests and forestland the emphasis should be on protection and improving their productivity, conservation of total biological diversity by strengthening the network of national parks, sanctuaries, biosphere reserves and other protected areas. It also emphasizes to provide sufficient fodder, fuel and pasture grasses in areas adjoining to forest so as to prevent their depletion and to protect, improve and enhance the production of minor forest produce, which provides sustenance to local tribal population. The other important features governing the management of the forests are as under:

- (i) Severe restriction on schemes and projects which interfere with forests that clothes steep slopes, catchments of rivers, lakes and reservoirs.

- (ii) No working of forests without the prior approval of management plans by the Government of India.
- (iii) Non-introduction of exotic species without long-term scientific trials.
- (iv) The rights and concessions, including grazing, always remain related to the carrying capacity of forests.
- (v) Rights and concessions, which cannot be met from the forests, are to be met through the development of Social Forestry.
- (vi) The rights and concessions enjoyed by the tribals should be protected. Their domestic requirements of fuel wood, fodder and minor forest produce and construction timber should be the first charge.
- (vii) Forest management plans to take special care of the needs of wildlife conservation.
- (viii) Effective action to be taken to prevent encroachments on forestland and not to regularize the existing encroachments.
- (ix) Forest based industries should raise the raw material needed by themselves in arrangement with the private cultivators.
- (x) Survey of forest resources to be completed on scientific lines for updating information.

SECTION-1.2: NATIONAL WILDLIFE ACTION PLAN (2002-2016):

1.2.1: PREAMBLE:

1.2.1.1: BACKGROUND:

The first National Wildlife Action Plan (NWAP) was adopted in 1983, based upon the decision taken in the XV meeting of the Indian Board for Wildlife held in 1982. The plan had outlined the strategies and action points for wildlife conservation, which are still relevant. In the meanwhile, however, some problems have become more acute and new concerns have become apparent, requiring a change in priorities. Increased commercial use of natural resources, continued growth of human and livestock populations and changes in consumption patterns are causing greater demographic impacts. Biodiversity conservation has thus become a focus of interest in NWAP. The National Forest Policy was also formulated in 1988, giving primacy to conservation. Hence, this new National Wildlife Action Plan.

1.2.1.2: OVERVIEW:

(i) The term Wildlife encompasses all uncultivated flora and undomesticated fauna. Every species has right to live and every threatened species must be protected to prevent its extinction.

(ii) Water, wilderness and wildlife are irrevocably interlinked. With mounting agricultural, industrial and demographic pressures, wilderness areas, which are the richest repositories of wildlife and biodiversity have either shrunk or disappeared. Their continued existence is crucial for the long-term survival of biodiversity and the ecosystems supporting them.

(iii) Effective ecosystem conservation is the fundamental of long-term ecological and economic stability. Natural processes, forests and other wildlife habitats recharge aquifers; maintain water regimes and moderate the impact of floods, droughts and cyclones. Thereby they ensure food security and regulate climate change. They are also a source of food, fodder, fuel and other products supplementing the sustenance of local communities.

(iv) India ranks sixth among the 12-mega biodiversity countries of the world. Conservation of biodiversity is directly linked with conservation of ecosystems and thus with water and food security. These together constitute a major plank of Indian economy.

(v) National planning has not taken into account the adverse ecological consequences of shrinkage and degradation of wilderness from the pressures of population and commercialization. As a result, we have witnessed the alarming erosion of our natural heritage, which comprises rivers, aquifers, forests, grasslands, mountains, wetlands, coastal and marine habitats, arid lands and deserts. This has also affected natural phenomena such as breeding, ranging and migration of wildlife and geomorphologic features

(vi) The increased frequency and intensity of natural disasters, the plummeting fertility of our soils and the accelerated degradation of our fresh water resources have imposed a crippling financial burden on the nation. This underscores the need to realign development priorities to take into account ecological imperatives including the protection of wild species, which sustain and enhance natural habitats, even as they depend on such areas for their survival.

(vii) Rural development for communities inhabiting forestlands and other wilderness regions suffers both from inadequate resources and inappropriate measures. It has failed to address their strong dependence upon natural biomass resources vis-à-vis the shrinking and degrading resource base. Farm productivity has also declined due to lack of proper support, causing impoverishment and enhanced pressures upon natural areas. Resource impoverished communities have therefore begun to place even greater pressure on the biomass of our forests and has led to widespread alienation of people from the goals of nature conservation efforts.

(viii) Habitats loss caused by development projects such as dams, mines etc. compound the problems of wildlife conservation.

(ix) The constraining impact of habitats loss has been compounded by illegal trade fuelled by a rising demand of wildlife products and their lucrative prices in the international markets.

1.2.2: *POLICY IMPERATIVES:*

1.2.2.1: *ECOLOGICAL SECURITY:*

To protect the long-term ecological security of India, the national development agenda must recognize the imperative of identifying and protecting natural ecosystems from over-exploitation, contamination and degradation. Short-term economic gains must not be permitted to undermine the ecological security.

1.2.2.2: *PRIORITY TO CONSERVATION:*

Assigning conservation a high priority both at the level of central and state governments is an imperative. Its integration in all development programmes, evolving appropriate funding mechanism, enhancement of financial allocations and provision of adequate personnel with requisite expertise has to be ensured, to arrest the ongoing trend of degradation and to restore wildlife and its habitats.

1.2.2.3: *NATIONAL LAND USE POLICY:*

The NWAP cannot be implemented in isolation. Wildlife conservation cannot be restricted to national parks and sanctuaries. Areas outside the protected area network are often vital ecological corridor links and must be protected to prevent isolation of fragments of biodiversity, which will not survive in the long run. Land and water use policies will need to accept the imperative of strictly protecting ecologically fragile habitats and regulating use elsewhere.

1.2.2.4: *PRIMACY FOR WATER AND SUSTENANCE:*

Water must be recognized as a prime product of natural forests. Forests must be managed to optimize and protect hydrological systems. The National Forest Policy of 1988 which emphasizes conserving our natural heritage in the form of natural forests, flora and fauna, is in consonance with this imperative. A critical imperative is also to recognize forests, wetlands and other natural habitats as a source of survival for millions of people, in particular as a source of NTFP and aquatic resources.

1.2.2.5: *IN SITU CONSERVATION:*

Primacy must be accorded to in situ conservation, the sheer anchor of wildlife conservation. Ex situ measures in zoological parks and gene banks may supplement these objectives, without depleting scarce wild resources.

1.2.2.6: PEOPLE'S SUPPORT FOR WILDLIFE:

Local communities traditionally depend on natural biomass and they must, therefore, have the first lien on such resources. Such benefits must be subject to assumption of a basic responsibility to protect and conserve these resources by suitably modifying unsustainable activities. Conservation programmes must attempt to reconcile livelihood security with wildlife protection through creative zonation and by adding new Protected Area (PA) categories in consultation with local communities, such as an inviolate core, conservation buffer, community buffer and multiple use areas.

1.2.2.7: MAN-ANIMAL CONFLICT:

While increasing man-animal conflict is an outcome of shrinkage, fragmentation and deterioration of habitats, it has caused destruction of wildlife and generated animosity against wild animals and protected areas. This is a crucial management issue, which needs to be addressed through innovative approaches.

1.2.3.1: STRATEGY FOR ACTION:

Adopting and implementing strategies and needs outlined above will call for action covering the following parameters:

- (i) Strengthening and enhancing the Protected Area Network.
- (ii) Effective Management of Protected Areas.
- (iii) Conservation of Wild and Endangered Species and Their Habitats.
- (iv) Restoration of Degraded Habitats outside Protected Areas.
- (v) Control Poaching, Taxidermy and Illegal Trade in Wild Animal and Plant Species.
- (vi) Monitoring and Research.
- (vii) Human Resource Development and Personnel Planning.
- (viii) Ensuring People's Participation in Wildlife Conservation.
- (ix) Conservation Awareness and Education.
- (x) Wildlife Tourism.
- (xi) Domestic Legislation and International Conventions.

- (xii) Enhancing Financial Allocation for Ensuring sustained Fund Flow to the Wildlife Sector.
- (xiii) Integration of National Wildlife Action Plan with Other sectoral Programmes.

SECTION-1.3: NATIONAL FORESTRY ACTION PROGRAM:

1.3.1. To reverse the process of degradation and for sustainable development of forests, the Government of India has prepared National Forestry Action Plan (NFAP), a comprehensive strategic plan to solve the major issues of the forestry sector. The objective of the NFAP is to enhance the forest resources and ecological stability qualitatively and quantitatively.

1.3.2. IDENTIFIED ISSUES IN FORESTRY SECTOR:

The objective of NFAP is to evolve issue based programs in the line of provisions of the National Forestry Policy, 1988. It is to integrate the forestry development programs in the country within the framework of National Five Year Plans. Five inter-related basic issues have also been identified and these are the basis of the following program structure.

- I. Protect the existing forest resources.
- II. Improve forest productivity.
- III. Reduce total demand.
- IV. Strengthen the policy and institutional framework.
- V. Expansion of forest areas.

1.3.3. PROTECT THE EXISTING FOREST RESOURCES:

It has three main sub-programs of (1) forest protection, (2) soil and water conservation, and (3) protected areas and biodiversity conservation. These include the works of forest survey, demarcation and mapping, inventory, biodiversity conservation, protected area management, protection against poaching, encroachment and fire and other related issues.

1.3.4. IMPROVE THE FOREST PRODUCTIVITY:

It has four main sub-programs of (1) rehabilitation of degraded forests, (2) research and technology development, (3) development of NWFPs, and (4) assisting private initiatives with community participation. These involve mainly research, improvement in technology, plantation, soil and water conservation, regeneration, rehabilitation and afforestation mainly in existing forests.

1.3.5. REDUCE TOTAL DEMAND:

It has three main sub-programs for the efficient uses of (1) fuel wood and fodder, (2) timber, and (3) NWFPs. This includes the programs for reduction of demand placed on forests through the technology of reservation, substitutions, and other measures or the efficient utilization of forest products and also through extensive biomass plantations.

1.3.6. *STRENGTHENING THE POLICY AND INSTITUTIONAL FRAME WORK:*

It has three main sub-programs of strengthening of (1) central forestry administration, (2) central forestry institutions, and (3) State forestry administration and institutions. These include the development of infrastructures like building, communications, etc. and strengthening of staff including HRD. This issue also covers all aspects of capacity building, forest policy and legislation, public forest administration and organizational structure, research, planning and budgeting etc.

1.3.7. *EXPANSION OF FOREST AREAS:*

It has two main sub-programs of (1) tree plantation on forest and non-forest lands, and (2) people's participation in plantations and its protection. This issue includes the extension of forestry programs in all kind of wastelands and marginal farmlands. It also includes the programs of creation of plantation forests through wasteland reclamation, afforestation and promotion of agro forestry.

1.3.8. *OBJECTIVES OF NFAP:*

Following are the objectives of the National Forestry Action Programs:

- i) For sustainability of forests, productivity of forest plantations to be increased at least 3 to 5 cubic meter per hectare per year by promoting regeneration and plantations.
- ii) Hygiene of forests to be improved through suitable silvicultural practices.
- iii) Efforts to be made to bring one-third geographic area of the country under forest and tree cover by plantations on all categories of wastelands and through agro-forestry.
- iv) Protected area network to be expanded and managed for biodiversity conservation.
- v) Plantations on non-forest wastelands to be done mostly by fuel wood species as 70% of the wood produce from forests are used as fuel wood. Species of pulpwood and other industrial wood may be encouraged in farm forestry.
- vi) Institution for the people's participation in protection and development of degraded forests should be strengthened.
- vii) NWFP species to be developed and value addition may be promoted at village level.

- viii) Grazing in forests to be regulated as per carrying capacity and silvicultural needs.
- ix) Infrastructure for forest inventory, research and development to be strengthened. HRD should also be improved.
- x) Investment for the sustainable development of forests should be rational and in proportionate to the total production.

SECTION – 1.4: OTHER EXISTING COURT ORDERS, RULES OF THE LAND AND NATIONAL WORKING PLAN CODE:

1.4.1. Forests are to be managed as per the guidelines issued from the apex Court of Country i.e. The Supreme Court of India and other Courts. The management of forests shall be in consonance to existing rules of the Land. Also the management of Forests will be in line to the National Working Plan Code and State Working Plan Code.

SECTION – 1.5: FACTORS INFLUENCING THE GENERAL OBJECTS OF MANAGEMENT:

1.5.1. The main factors influencing the object of management are listed below:

- (i) Due to naxalite movement in this tract the forests were not managed scientifically during previous plans. These forests are getting unhealthy due to lack of proper scientific management. These forests will have to be managed in scientific manner in order to obtain sustained yield.
- (ii) The increasing demand by local population for firewood, small timber and fodder grass around villages have affected the forests. Hence adequate provisions have to be made in the plan for meeting the demands.
- (iii) The state of natural regeneration of teak and miscellaneous species is satisfactory in interior areas of the tract, where as it is unsatisfactory in plains, and nearby human habitations. New recruits are not established due to frequent fires, grazing and excessive biotic pressure. Provisions will have to be made in the plan for establishment of young natural regeneration.
- (iv) The forest tract around populated area is opened, under stocked and degraded, which need improvement in their stocking by tending natural regeneration supplemented by artificial regeneration.
- (v) The forest areas of steep slopes, undulating areas and along water courses are liable for soil erosion hence provisions to be made in the plan to check the same.
- (vi) There is increasing demand for the timber of teak and other important species in the market.
- (vii) Owing to excess cattle population the demand of fodder increased around these villages.

- (viii) Restoration of degraded environment is the national object.
- (ix) The tract is experiencing threat to forest staff and grabbing of forestland under the cover of naxalism. The Government must give adequate protection to forest staff as well as forestland to maintain ecological and social life intact.
- (x) To improve the habitat and hygiene of wildlife.
- (xi) Large tract of forests that were managed under the coppice with reserved system of previous plan and scheme have suffered due to heavy grazing, illicit felling and lack of coppice regeneration, with the result that bulk of forest areas have become under stocked and open and fail to regenerate. These forests may respond if they are restocked under afforestation scheme coupled with soil and moisture conservation works.

SECTION: 1.6. SPECIAL OBJECTS OF MANAGEMENT:

1.6.1. Important factors, which influence the general objects of management, are the rapid depletion of growing stock around the populated villages due to various causes. In consonance with National Forest Policy 1988, the special objects of management will be as follows:

- xi) To preserve forest cover on steep hill slopes, along the rivers and nala banks to prevent soil erosion.
- xii) To enrich the growing stock in other natural forests and to restock all the under stocked and degraded forests and to achieve the normality of growing stock in the shortest possible time.
- xiii) To meet the requirement of small timber, fuel wood, fodder and minor forest produce of the rural and tribal population on top priority.
- xiv) To increase the production of minor forest produce and to manage the same scientifically to utilize the potential to the maximum possible extent on sustained basis.
- xv) To increase the productivity and ensure progressively increasing yield of forest produce in demand.
- xvi) To achieve compatible wildlife management with emphasis on rare, endangered and endemic species like tigers, panthers, wild buffalos, four horned antelopes, sloth bears, wild dogs and sambars.

SECTION-1.7: ANALYSIS AND VALUATION OF THE CROP:

1.7.1. 1% systematic sampling method was adopted for enumeration of growing stock during 2004-05 to 2006-07 by Survey of Forest Resources Unit

(SOFR) Chandrapur-2. The confidence limit was kept within $\pm 5\%$. The results of enumeration have been given in Appendix No. XVII of Volume II.

Table No.29

TABLE SHOWING SPECIES WISE COMAPRISION IN DISTRIBUTION

Enumeration	1984-86	2004-06	Difference in no. of trees	% of difference
Species	Total no. of trees	Total no. of trees		
Ain	33.70	47.77	(+)14.07	(+) 42%
Bija	11.21	16.69	(+)5.48	(+)4.9%
Behada	0.58	14.29	(+)13.71	(+)2364%
Dhawda	28.24	32.85	(+)4.61	
Garadi	83.40	109.30	(+)25.90	(+)31%
Khair	4.18	7.84	(+)3.66	(+)88%
Lendia	13.00	26.88	(+)13.88	(+)107%
Teak	6.13	21.91	(+)15.78	(+)257%
Shisham	1.81	4.20	(+)2.39	(+)132%
Salai	6.00	8.29	(+)2.29	(+)38%
Tiwas	2.03	3.63	(+)1.60	(+)79%
Semal	0.77	2.58	(+)1.81	(+)235%
Total	191.05	296.23	(+)105.18	(+)55%

1.7.2. The Stock Maps have been updated through field visits based on the stock maps prepared during earlier plan.

Table No.30

STATEMENT SHOWING THE DISTRIBUTION OF STOCK IN DIFFERENT WORKING CIRCLES.

Site quality	S.C.I.	I.W.C.	A.W.C.	SP.W.C.	G.Total
Teak-III	480.21	628.98	238.55	0	1347.74
Teak-IV a	971.00	712.09	191.17	0	1874.26
Teak-IV b	40.98	170.69	109.26	0	320.93
Plantation	2729.03	5193.13	4037.35	1293.00	13252.51
Misc-III	46396.68	18872.45	1318.79	1574.69	68162.61
Misc-IV a	32840.39	22286.83	4109.74	1245.76	60482.72
Misc-IV b	8317.76	17899.53	10628.85	2608.78	39454.92
Under stocked	790.81	1237.84	1715.01	846.24	4589.90
Encroachment	11890.73	10095.34	5198.14	3029.49	30213.70
River bed	0	14.77	0	0	14.77

1.7.3. Quality classification based on the average height of mature dominant trees has been used for showing the site qualities. The following four quality classes have been recognized for the purpose of stock mapping of the growing stock.

Table No.- 31

Quality Class	Average height of matured dominant trees in m.
I	Above 27 m.
II	21 to 27 m.
III	15 to 21 m.
IV	Up to 15 m.

The quality classes are distinguished within the following types.

1.7.4. A. TEAK TYPE:

The forests in which the percentage of teak is more than 20% of the growing stock are classified as teak forest.

1.7.4. B. MIXED MISCELLANEOUS TYPE:

The forests in which the percentage of teak is less than 20% of the growing stock are included in the mixed miscellaneous type of forests.

1.7.5. The quality of bamboo is locally decided as follows: -

Table No. –32

Quality Class	Height in m.	Girth at 1st internode
1st	10 m. & above	12.5 cm. & above
2nd	Below 10 m.	Below 12.5 cm.

SECTION: 1.8: CLASSIFICATION OF FORESTS:

1.8.1. The State Government vide GR No MEP-1365/132211-Y, dated December 6, 1968 classified the state forests into following classes on functional basis:

1.8.1.1. PROTECTION FORESTS:

This category includes forests occur on very steep slopes, 25° and above or along river banks and forest that have become depleted through mal-treatment and further harvesting of which will accelerate soil erosion and adversely affect the productivity of agricultural lands in the lower regions. The management prescriptions aim at soil and moisture conservation.

1.8.1.2. TREE FORESTS:

This includes forests that are situated in remote areas and prominently suited for producing a large sized timber and other products of commercial value.

1.8.1.3. MINOR FORESTS:

It includes forests that are honey combed with cultivated lands capable of producing small timber and firewood providing grazing to local cattle.

1.8.1.4. PASTURE LANDS:

This category includes open and under stocked forests that have ceased to yield even small timber but are conveniently suitable for grazing to the local cattle.

1.8.1.5. MISCELLANEOUS FORESTS:**(a) GRASS RESERVES:**

Open forests that are interspersed with cultivated lands capable of producing good fodder grass are included in this category.

(b) REMAINING AREAS:

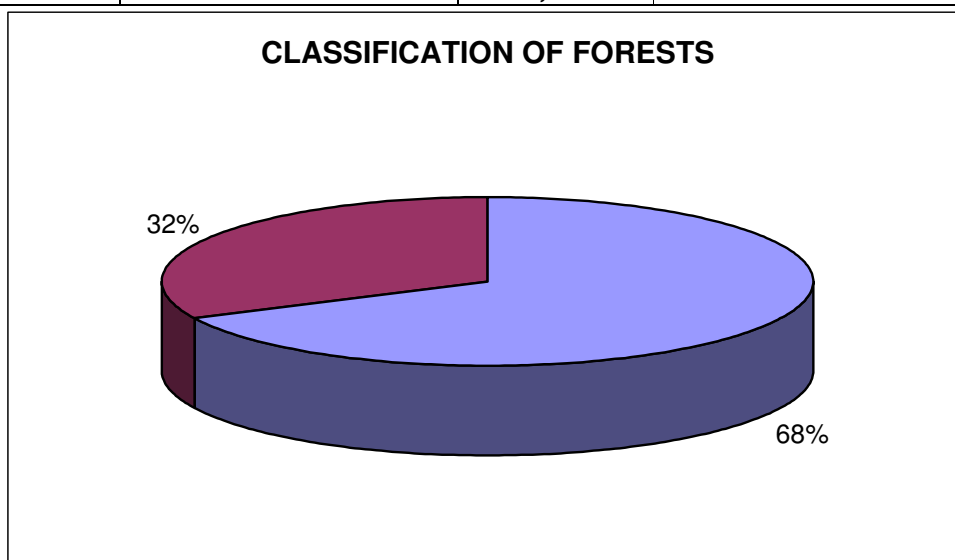
Remaining areas needed for other works.

1.8.2: With regard to wildlife habitats, the entire tract is potential habitat for many kinds of wildlife. But wild animal are found comparatively in small number.

Table No. -33

TABLE SHOWING THE EXTENT OF FORESTS AS PER FUNCTIONAL CLASSIFICATION OF FORESTS

Sr.No.	Class of Forests	Area in ha	% wrt Dn
1	Tree Forests	147,913.85	68%
2	Minor forests	70,615.42	32%
	Total	218,529.27	100%



SECTION- 1.9. METHOD OF TREATMENT:

1.9.1. The New Forest Policy has laid emphasis on conservation of biodiversity and meeting the demands of the local people. Accordingly the objects of management of the forest have been fixed. To achieve these objectives, new approach has been adopted in the management of forest. For the conservation of biodiversity and the site, soil and moisture conservation works will be taken. These works will be taken on watershed basis. The working of forest will be rearranged so as to co-inside with the watershed boundaries. Natural regeneration will be preferred over the artificial regeneration, in areas where it is adequate. Suitable soil working and tending operations will be carried out to stimulate and enhance the growth of naturally regenerated seedlings. To meet local demand of the people, an assessment of their requirement will be made and efforts will be made to meet these requirements from the forests. Provision will be made to fill the gap between supply and demand from outside the forest through Social Forestry. Involvement of local people in plantation and other forestry activities has been proposed as per the guidelines of Joint Forest Management issued by Government of Maharashtra and Government of India from time to time. The functional classification of the forest has been made by taking into consideration the above aspects besides the growing stock and condition of site. The various types of forests will be treated as follows.

1.9.2. PROTECTION FORESTS:

These areas will be excluded from commercial felling. The degraded and erosion prone areas will be treated by adopting the suitable soil and water conservation works. All the forest areas having density less than 0.4 will be allotted to afforestation, improvement and Silvi-pastoral development working circles and plantations will be taken up as per the requirement of the site.

1.9.3. TREE FORESTS:

This type of forest includes the better quality forest capable of producing large sized timber, which are situated far away from villages and biotic pressure on such land is comparatively less. They have been worked under S.C.I. and C.W.R. Systems of Prabhu's Working Scheme and under SCI working circle in the previous plan. They will be managed to produce large sized timber. The steep slopes will be excluded from harvesting but will be covered under soil and moisture conservation works. The natural regeneration in most of these areas is adequate and will be properly tended. In areas where natural regeneration is inadequate, planting of teak will be taken up to enhance the productivity of the area.

The areas having crop of middle age to mature, will be worked under selection-cum-improvement working circle.

In case of old teak plantations thinning operations will be carried out. Thinning schedule will be given for different age group of plantations in OTPWC of this plan.

1.9.4. MINOR FORESTS:

Poor quality of forests with density less than 0.4 subjected to heavy biotic pressure are included in this category. Soil and moisture conservation works, plantation of indigenous species especially for small timber, poles, fodder and firewood will be taken to meet the local demand. Tending of existing natural regeneration will be taken up. These areas will be treated under Improvement working circle, Silvi-pastoral development working circle, Tussar working circle, and Afforestation working circle.

1.9.5. MISCELLANEOUS FORESTS:

This will include those areas, which were not included in aforesaid classes. This will include 882.22 Ha. Zudpi Jungle, which has been transferred to the Forest Department. These areas are to be transferred in to Reserve Forests and required proposal for the notification under section 4 should be sent to the government. The statement showing Range, village and survey number wise area has been given in the Appendix No. VI & VII of Volume II.

SECTION: 1.10: FORMATION OF WORKING CIRCLES:

1.10.1. Based on the objectives of the management and the methods of treatment, the following working circles are being proposed:

Table No. -34

TABLE SHOWING WORKING CIRCLES AND AREA OF PRESENT PLAN

Sr. No.	Name of Working Circle	Area allotted in Ha.
1	Selection cum Improvement Working Circle	103556.14
2	Improvement Working Circle	76108.13
3	Afforestation Working Circle	27867.04
4	Fodder Development Working Circle	10425.96
5	Tussar Plantation Working Circle	572.00
6	Bamboo (Overlapping) Working Circle	138858.91
7	Non-Wood Forest Produce (Overlapping) Working Circle	218529.27
8	Joint Forest Management (Overlapping) Working Circle,	218529.27
9	Wildlife Management (Overlapping) Working Circle.	218529.27
10	Forest Protection (Overlapping) Working Circle.	218529.27
11	Total Working Plan area	218529.27

Table No. -35

TABLE SHOWING WORKING CIRCLE AREA OF PREVIOUS AND PRESENT PLANS

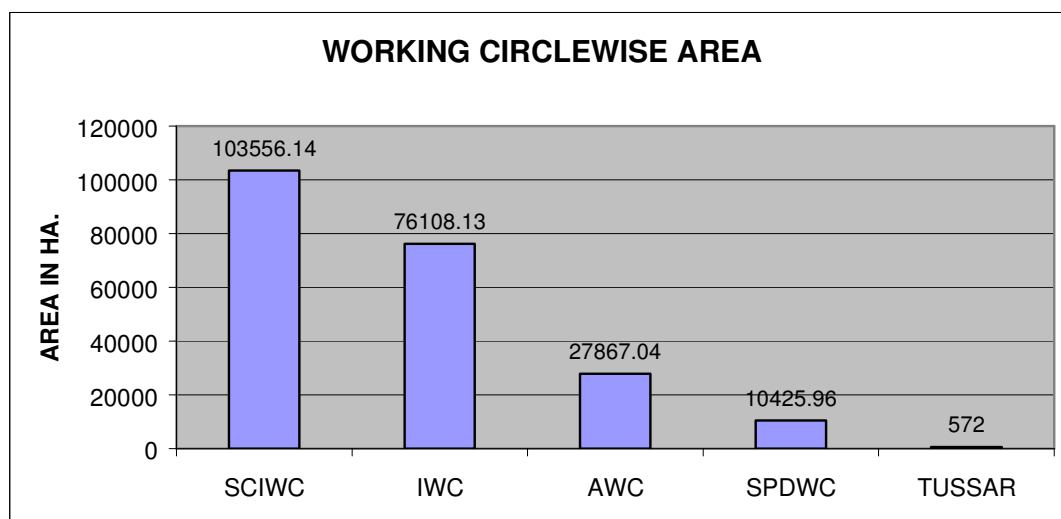
Sr.No	Working Circles	B.P.Singh Plan (area in ha)	Present Plan (area in ha)	Remarks
1	Selection Cum Improvement WC	148195.86	103556.14	(-) 44639.72
2	Improvement WC		76108.13	(+) 76108.13
3	Afforestation WC	69761.22	27867.04	(-) 41894.18
4	Fodder Development .WC	--	10425.96	(+) 10425.96
5	Tussar WC	572.00	572.00	--
6	Bamboo (Overlapping) WC	120659.52	138858.91	(+) 21287.19
7	N.W.F.P. (Overlapping) WC	Entire area	Entire area	--
8	Wildlife (Overlapping) WC	Entire area	Entire area	--
9	J.F.M. (Overlapping) WC	Entire area	Entire area	--
10	Forest Protection	Entire area	Entire area	--
	Working Plan Area	218,529.27	218,529.27	--

1.10.2. Range wise and working circle wise distribution of forest area has been given in the following table and the details of compartments allotted to these working circles have been given in Appendix No. XXII, XXV, XXVIII, XXXIII, XXXII, and XXXVI of Volume II.

Table No.-36

TABLE SHOWING RANGE WISE & WORKING CIRCLE WISE AREA

Range	Range area	SCIWC	IWC	AWC	SPDWC	TUSSAR
Chatgaon	25360.10	6419.78	9769.76	7181.28	1851.28	138..00
Dhanora North	22207.41	10068.45	6506.52	4867.63	752.81	12.00
Dhanora South	24537.42	16830.04	6002.18	899.93	801.27	4.00
Gadchiroli	22518.61	2790.08	9171.16	8063.47	2341.90	152.00
Kunghada	24678.51	1341.31	15280.51	5196.71	2603.98	256.00
Murumgaon(E)	22541.41	14528.96	7027.69	--	1004.76	--
Murumgaon(W)	21485.04	15125.64	5289.46	--	1069.96	--
Pendhari	34879.62	27503.40	7356.22	--	--	--
Potegaon	20321.15	8948.48	9704.65	1658.02	--	10.00
Division Total	218,529.27	103556.14	76108.13	27867.04	10425.96	572.00
% wrt dn area	100%	47.39%	34.83%	12.75%	4.77%	0.26%



SECTION- 1. 11: BLOCKS AND COMPARTMENTS:

1.11.1. Total forest area of the tract has been divided into 766 compartments. Forests were notified as reserved forests in blocks during 1879 and protected forests during 1955, 1957 & 1959. Recent reserve forest notifications were made in 1992.

SECTION 1.12: PERIOD OF THE PLAN:

1.12.1. The period of the plan is fixed for 10 years from 2007-08 to 2016-17. The performance of this plan will be reviewed after 5 years of its implementation, if necessary proposals received from concerned territorial Conservator of Forests.

CHAPTER- II

WORKING PLAN FOR SELECTION-CUM-IMPROVEMENT WORKING CIRCLE

SECTION. 2.1. GENERAL CONSTITUTION OF THE WORKING CIRCLE:

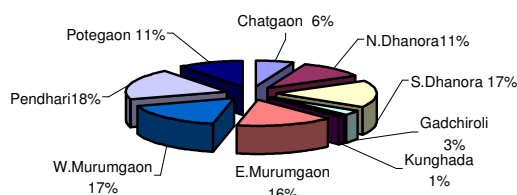
2.1.1. Selection Cum Improvement Working Circle (SCIWC) comprises of forest areas of uneven aged trees with adequate natural regeneration. Most of these forests were worked under the same Silvicultural system i.e. SCIWC during previous working plan period but areas which are found deficient with natural regeneration have been brought under Improvement working Circle (IWC), Afforestation Working Circle (AWC) and Fodder Development Working Circle. Similarly the areas, which were worked under Afforestation working Circle during previous plan period and conform to the norms of SCIWC have been brought under SCIWC in the present plan.

2.1.2. Range wise distribution of forest area under Selection Cum Improvement Working Circle is given in the following table.

Table No.-37
TABLE SHOWING RANGE WISE AREA IN SCIWC

Sr.No	Range	Area of Range(ha)	Area in SCIWC (ha)	% wrt Range Area
1	Chatgaon	25,360.10	6,419.78	25.31%
2	Dhanora North	22,207.41	10,068.45	45.34%
3	Dhanora South	24,537.42	16,830.04	68.59%
4	Gadchiroli	22,518.61	2,790.08	12.39%
5	Kunghada	24,678.51	1,341.31	5.44%
6	Murumgaon East	22,541.41	14,528.96	64.45%
7	Murumgaon West	21,485.04	15,125.64	70.40%
8	Pendhari	34,879.62	27,503.40	78.85%
9	Potegaon	20,321.15	8,948.48	44.04%
10	Division	218,529.27	103,556.14	47.39% wrt division area

RANGEWISE AREA IN SCIWC



SECTION. 2. 2. GENERAL CHARACTER OF THE VEGETATION:

2.2.1. This Working Circle comprises of good quality miscellaneous forests, with dense understorey of bamboo. These forests are mostly situated in hilly areas. Teak is found in scattered patches mostly confined to banks of nalas and other watercourses. Percentage of teak in mixed miscellaneous forests varies from 5% to 10%. These forests exhibit a great genetic diversity. The main tree species are *Teak, Ain, Bija, Dhaoda, Tendu, Moha, Lendia, Garari, Haldu etc.* The crop changes its quality, density and composition from place to place and often within short distances. The density of the crop varies from 0.5 to 0.9 with patches of under stocked areas too. The site quality varies from II to III with some open patches. Most of the forests included in this Working Circle have a dense under storey of bamboo. There is a considerable degree of congestion in the clumps. Common species of bamboo found in this tract is *Dendrocalamus strictus*. Along the riverbanks or nala sides, Katang bamboo (*Bambusa arundinaceae*) is also found. The over all status of natural regeneration of miscellaneous forests is satisfactory. The advantage of this regeneration will be taken in to consideration to regenerate the area further. Though the forests consists mainly of miscellaneous species yet it is capable of growing teak as well in certain suitable areas. Therefore to increase the value of the crop and productivity of the area, teak will be introduced in the areas by way of gap planting so that the over all percentage of teak will be increased.

SECTION.2. 3. BLOCKS AND COMPARTMENTS

2.3.1. Selection cum Improvement Working Circle consists of forest areas to the tune of 103556.14 ha which is 47.39% of the total plan area. No block formation has been segregated for exclusive management of forests under this working circle. The distribution of the compartments allotted to this working circle has been given in Appendix No. XXII of Volume II.

SECTION. 2.4. SPECIAL OBJECTS OF MANAGEMENT:

2.4.1. The special objects of management are:

- (i) To improve the quality and to increase the proportion of valuable tree species by giving preferential treatment to the naturally regenerated seedlings and by planting timber species mainly Teak in teak supporting areas, in the gaps as well as where the natural regeneration is not sufficient.
- (ii) To produce large sized trees to meet the requirement of timber.
- (iii) To maintain and improve the soil cover by way of soil and water conservation measures particularly on the principle of water shed management.
- (iv) To plant bamboo wherever possible to increase yield of bamboo.

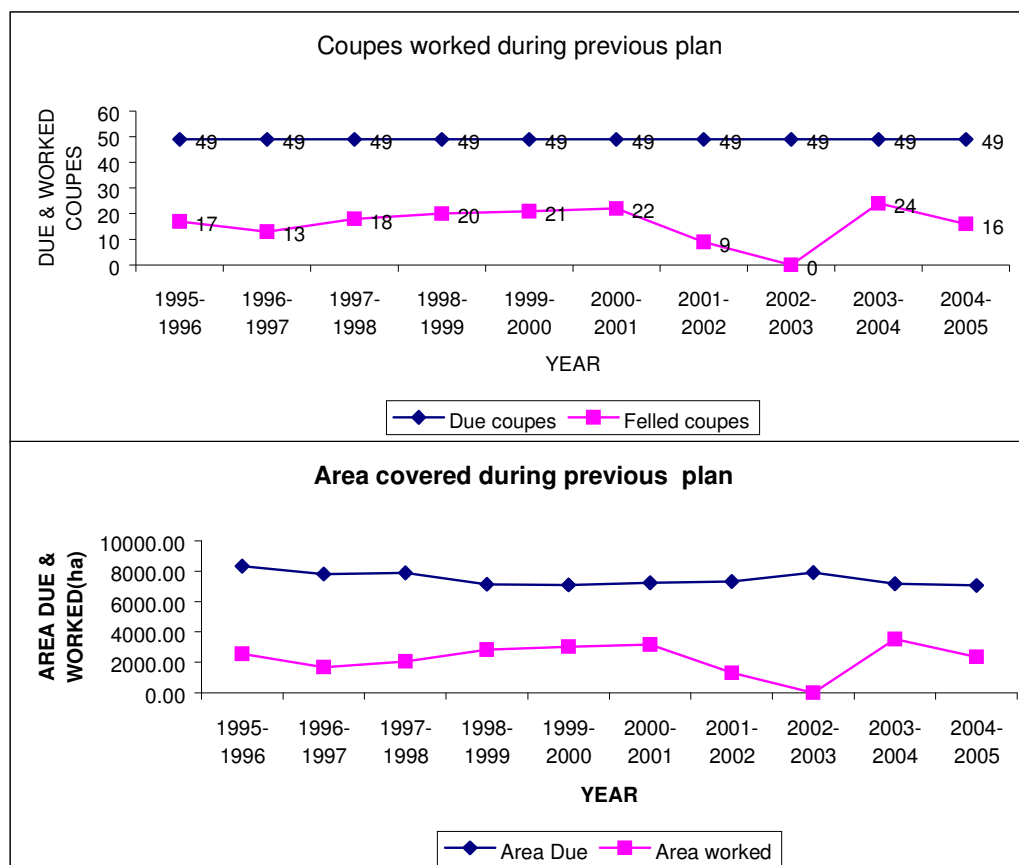
SECTION. 2.5. ANALYSIS AND VALUATION OF THE CROP:

2.5.1. PREVIOUS WORKING & ANALYSIS:

The Works done during the previous plan period is given in the following table with graphical representations.

Table No.38

Year	Due coupes	Felled coupes	Area (ha) Due	Area (ha) worked	Timber m ³	Fuelwood beat	Total m ³
1995-96	49	17	8339.53	2552.25	1361.74	11964.00	13325.74
1996-97	49	13	7811.86	1680.35	1187.84	8109.00	9296.84
1997-98	49	18	7887.93	2066.74	1957.29	12150.50	14107.79
1998-99	49	20	7148.73	2830.68	2848.84	13399.50	16248.34
1999-00	49	21	7100.79	3038.27	2747.57	13978.00	16725.57
2000-01	49	22	7235.58	3170.42	2607.16	15451.50	18058.66
2001-02	49	9	7325.29	1318.67	538.05	3318.50	3856.55
2002-03	49	0	7915.52	0.00	0.00	0.00	0.00
2003-04	49	24	7192.28	3536.70	2139.95	14608.15	16748.10
2004-05	49	16	7060.81	2359.21	1296.27	9491.50	10787.77
	490	160	75018.32	22553.29	16684.69	102470.65	119155.34
Working done		32.70%		30.10%	0.74 m ³ /ha	4.54 beat/ha	5.28 m ³ /ha



From the above table, it is found that only 32.7% of due coupes have been worked and area wise only 30.1% of area have been tackled. Production per ha is as follows: Timber-0.74 cu.mt. per ha, Firewood- 4.54 beat per ha totaling 5.28 cu.mt. per hectare. As per yield calculation for first cycle of the plan, average yield per ha of working would have been 4.994 cu.mt. per ha. Thus the harvested yield of 5.28 cubic meter per ha is within the anticipated yield of 4.994 cu.mt. per ha with (+) 5.7% margin which is within the permissible limit of ($\pm$) 10%.

2.5.2. ENUMERATION:

Enumeration of growing stock has been conducted by the Survey of Forest Resources Units Chandrapur during 2004-05, 2005-06 and 2006-07 by following stratified systematic random sampling method. The intensity of sampling was 1%. At the corner of Grids 600m x 600m, sample plots of 60m x 60m were laid for enumeration of trees and shrubs, species wise. Enumeration was done in 15 cm. girth interval classes starting from 15-30, 31-45, 46-60, and so on. In each sample plot sub plots of 20m x 20m have been laid to know the extent of regeneration of all species. Sub plots of 5m x 5m were laid down to enumerate herbs and medicinal plants and in 1m x 1m sub plots grass species were to be enumerated. Besides trees, shrubs and herbs bamboo is also enumerated in each sample plot. First the number of clumps are enumerated, then one out of each ten clumps, the number of culms are counted. The results are computed with the help of program prepared by Shri N S Dhabekar ACF Gadchiroli. The results have been given in Appendix No. XVII of Volume II.

2.5.3. Statement showing girth class wise number of trees per hectare, basal area in square meter per hectare and growing stock in cubic meter per hectare as computed on the basis of enumeration during 2004-07 is given below.

Table No.-39
Enumeration data

spp	15-30	31-45	46-60	61-75	76-90	91-105	106-120	121-135	136-150	151& up	Total
Ain	9.96	7.46	5.76	5.35	5.31	4.34	3.55	2.43	1.71	1.90	47.77
Akola	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
Ali	0.07	0.15	0.07	0.05	0.03	0.00	0.01	0.00	0.00	0.00	0.38
Amba	0.03	0.00	0.01	0.02	0.01	0.02	0.02	0.02	0.03	0.13	0.29
Amti	0.07	0.06	0.04	0.04	0.00	0.00	0.00	0.01	0.00	0.00	0.22
Anjan	0.13	0.21	0.16	0.15	0.13	0.12	0.10	0.10	0.11	0.21	1.42
Aonla	1.94	2.36	2.00	1.46	0.99	0.46	0.21	0.08	0.02	0.02	9.54
Apta	0.05	0.06	0.04	0.02	0.03	0.01	0.01	0.00	0.00	0.00	0.22
Arjun	0.07	0.08	0.02	0.01	0.05	0.01	0.00	0.02	0.00	0.02	0.28
Bahawa	0.84	0.91	0.66	0.36	0.21	0.07	0.05	0.03	0.00	0.02	3.15
Beheda	3.04	3.10	2.50	1.84	1.31	0.99	0.59	0.36	0.25	0.31	14.29
Bel	0.12	0.16	0.19	0.11	0.08	0.02	0.00	0.01	0.01	0.02	0.72
Bhirra	0.75	0.60	0.35	0.19	0.13	0.08	0.06	0.01	0.00	0.00	2.17
Bhokar	0.01	0.01	0.02	0.02	0.01	0.00	0.00	0.01	0.00	0.00	0.08
Biba	1.15	1.17	1.05	0.67	0.39	0.21	0.10	0.05	0.01	0.05	4.85
Bija	1.26	1.80	1.78	1.98	2.10	2.11	1.87	1.46	1.04	1.29	16.69
Bor	0.04	0.03	0.08	0.07	0.02	0.02	0.02	0.01	0.02	0.03	0.34

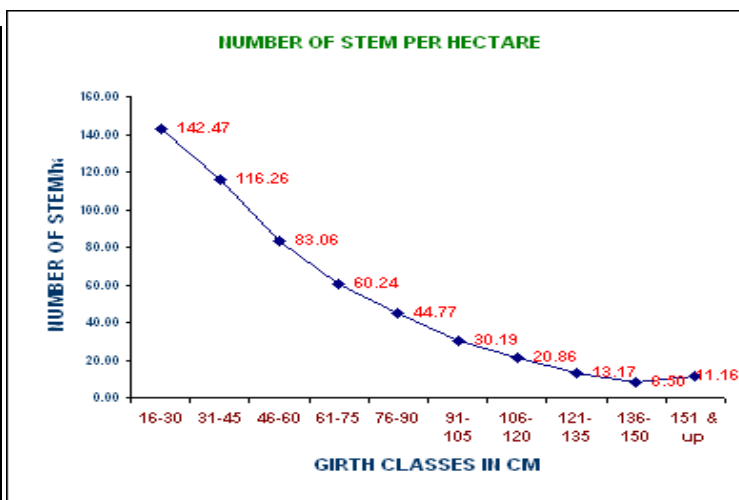
Char	5.81	5.42	3.84	2.32	1.10	0.47	0.20	0.06	0.03	0.01	19.26
Chichwa	0.35	0.44	0.49	0.51	0.41	0.37	0.32	0.15	0.18	0.21	3.43
Chinch	0.00	0.01	0.00	0.00	0.02	0.02	0.00	0.00	0.01	0.05	0.11
Dhaman	0.69	1.02	0.75	0.40	0.19	0.13	0.04	0.05	0.02	0.01	3.30
Dhaoda	8.74	6.30	4.55	4.06	3.27	2.41	1.61	0.97	0.51	0.43	32.85
Dhoban	0.57	0.78	0.64	0.69	0.53	0.61	0.48	0.38	0.28	0.41	5.37
Garadi	38.07	29.23	19.07	11.87	6.65	2.87	1.04	0.32	0.12	0.06	109.30
Gongal	0.14	0.20	0.14	0.05	0.01	0.02	0.00	0.00	0.00	0.00	0.56
Haldu	0.18	0.26	0.22	0.23	0.20	0.16	0.11	0.07	0.13	0.17	1.73
Hirda	0.53	0.53	0.62	0.54	0.48	0.31	0.20	0.13	0.07	0.09	3.50
Vishtendu	0.13	0.13	0.09	0.04	0.06	0.01	0.02	0.01	0.00	0.00	0.49
Jambhul	0.37	0.50	0.35	0.35	0.28	0.24	0.20	0.11	0.08	0.18	2.66
Kakad	0.12	0.10	0.10	0.09	0.08	0.02	0.04	0.00	0.02	0.04	0.61
Kakai	1.85	2.19	1.28	0.79	0.48	0.21	0.09	0.03	0.00	0.02	6.94
Kalamb	0.34	0.44	0.45	0.46	0.40	0.39	0.25	0.22	0.14	0.26	3.35
Karai	0.08	0.11	0.09	0.05	0.03	0.03	0.00	0.00	0.00	0.01	0.40
Karanj	0.13	0.11	0.09	0.05	0.00	0.01	0.00	0.00	0.01	0.00	0.40
Karu	0.04	0.02	0.02	0.02	0.03	0.02	0.02	0.00	0.00	0.01	0.18
Kateain	0.96	1.42	1.28	0.95	0.75	0.46	0.28	0.18	0.10	0.12	6.50
Kawath	0.02	0.00	0.01	0.00	0.03	0.01	0.00	0.00	0.00	0.02	0.09
Kawi	0.22	0.09	0.03	0.04	0.05	0.04	0.05	0.03	0.04	0.01	0.60
Khair	2.61	2.61	1.41	0.69	0.33	0.10	0.07	0.01	0.01	0.00	7.84
Kumbhi	0.45	0.51	0.48	0.42	0.40	0.32	0.28	0.14	0.07	0.17	3.24
Kusum	1.01	1.14	1.12	0.90	0.85	0.61	0.54	0.35	0.34	0.77	7.63
Lendia	10.86	6.71	3.83	2.44	1.59	0.79	0.38	0.16	0.07	0.05	26.88
Medsing	0.03	0.03	0.00	0.02	0.04	0.00	0.00	0.02	0.01	0.02	0.17
Moha	3.20	2.22	1.73	1.49	1.52	1.32	1.22	1.08	0.68	1.33	15.79
Mokha	0.55	0.85	0.93	0.80	0.77	0.43	0.30	0.16	0.08	0.11	4.98
Mowai	1.70	1.88	1.87	1.84	1.70	1.41	1.03	0.56	0.35	0.25	12.59
Pakad	0.04	0.09	0.04	0.01	0.02	0.00	0.00	0.02	0.00	0.04	0.26
Palas	2.24	2.18	1.52	1.11	0.82	0.52	0.23	0.17	0.06	0.07	8.92
Parad	0.49	0.72	0.75	0.69	0.50	0.30	0.19	0.09	0.05	0.04	3.82
Pimpal	0.07	0.06	0.08	0.04	0.02	0.02	0.02	0.03	0.01	0.13	0.48
Rankel	0.17	0.15	0.12	0.09	0.12	0.09	0.05	0.08	0.05	0.10	1.02
Rohan	2.96	2.08	1.75	1.27	0.79	0.42	0.24	0.12	0.06	0.03	9.72
Salai	0.40	0.59	0.75	1.05	1.28	1.32	1.19	0.84	0.43	0.44	8.29
Semal	0.30	0.27	0.46	0.24	0.30	0.35	0.27	0.14	0.10	0.15	2.58
Shisham	0.56	0.74	0.81	0.73	0.61	0.35	0.20	0.09	0.05	0.06	4.20
Shiwan	0.43	0.89	0.46	0.23	0.18	0.10	0.07	0.07	0.05	0.02	2.50
Surya	3.84	3.51	2.99	2.13	1.29	0.64	0.27	0.11	0.06	0.02	14.86
Teak	7.76	5.89	3.66	2.19	1.58	1.15	1.01	0.59	0.35	0.40	24.59
Tendu	9.28	4.00	2.45	2.14	1.88	1.51	1.18	0.70	0.43	0.55	24.12
Tiwas	0.31	0.55	0.66	0.68	0.52	0.39	0.20	0.15	0.14	0.03	3.63
Wad	0.00	0.02	0.00	0.02	0.01	0.00	0.00	0.01	0.06	0.07	0.19
Other	15.64	12.02	6.67	3.25	1.82	0.78	0.38	0.17	0.05	0.20	40.98
No of trees/ha	143.79	117.19	86.38	60.32	44.77	30.19	20.86	13.17	8.50	11.16	536.35
BA/ha	0.6	1.35	1.93	2.22	2.45	2.31	2.12	1.72	1.38	2.22	18.30
Vol/ha	2.01	3.28	6.05	10.26	11.42	10.27	10.12	8.30	6.93	11.16	79.78

BA = Basal Area in square meter per hectare

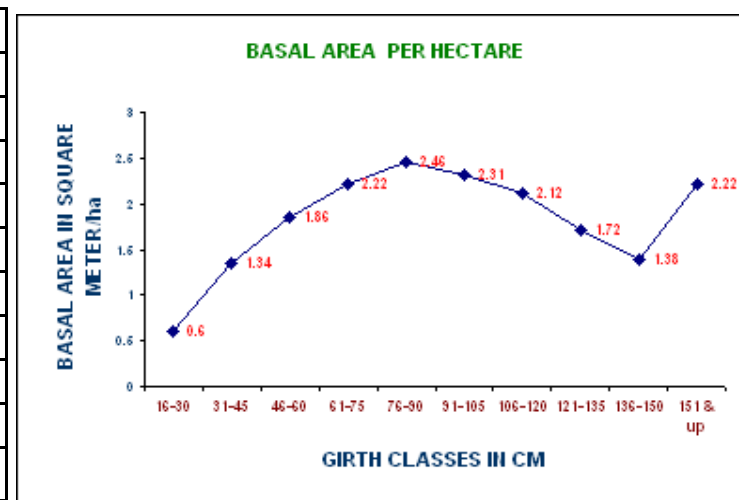
Vol = Volume is as per quarter girth formula and unit is cubic meter per hectare. /

Table No.-40
Table showing distribution of trees/ha in SCIWC
 (Girth class is in centimeter at breast height; BA = Basal Area in square meter and GS = Growing Stock in cubic meter)

Girth Class	No/ha
16-30	143.79
31-45	117.19
46-60	86.38
61-75	60.32
76-90	44.79
91-105	30.19
106-120	20.86
121-135	13.17
136-150	8.50
151 & up	11.16
No of stem/ha	536.35



Girth Class	BA/ha
16-30	0.6
31-45	1.35
46-60	1.93
61-75	2.22
76-90	2.45
91-105	2.31
106-120	2.12
121-135	1.72
136-150	1.38
151 & up	2.22
Total	18.30



Girth Class	Vol/ha
16-30	2.01
31-45	3.28
46-60	6.05
61-75	10.26
76-90	11.42
91-105	10.27
106-120	10.12
121-135	8.30
136-150	6.93
151 & up	11.16
Total	79.78

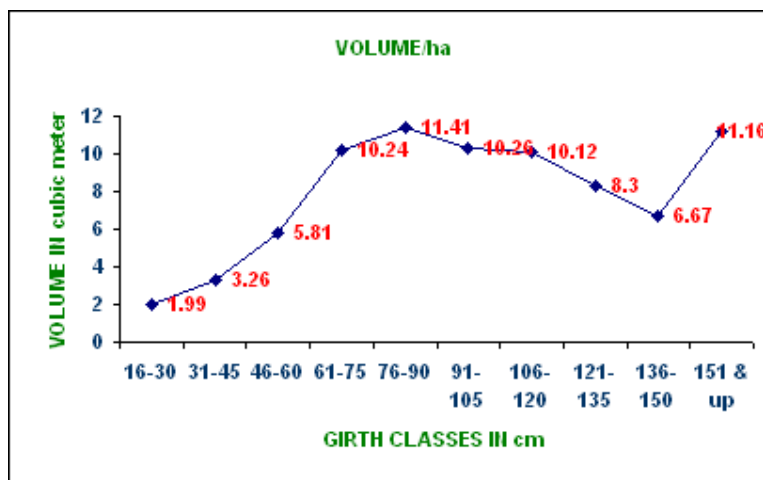


Table No.-41

TABLE SHOWING THE CHANGE IN NUMBER OF TREES IN DIFFERENT GIRTH CLASSES FROM 1984-86 ENUMERATIONS TO 2004-06

Girth Classes(cm)	1984-86	2004-06	Difference	% increase
15-30	75.27	143.79	68.52	91%
31-45	71.30	117.19	45.89	64%
46-60	53.16	86.38	33.22	62%
61-75	38.36	60.32	21.96	57%
76-90	25.69	44.79	19.1	74%
91-105	15.68	30.19	14.51	93%
106-120	9.39	20.86	11.47	122%
121-135	6.50	13.17	6.67	103%
>135	8.11	19.66	11.55	142%
Total	303.46	536.35	232.89	77%

Table No.-42

Comparison of growing stock of 1984-86 with 2004-06 in Gadchiroli Division

Year of enumeration	1984-86			2004-06		
	Trees/ha	BA/ha	Vol/ha	Trees/ha	BA/ha	Vol/ha
15-30	75.27	0.32	1.05	143.79	0.60	2.01
31-45	71.30	0.82	2.00	117.19	1.35	3.28
46-60	53.16	1.19	3.72	86.38	1.93	6.05
61-75	38.36	1.41	6.52	60.32	2.22	10.26
76-90	25.69	1.41	6.55	44.79	2.45	11.42
91-105	15.68	1.20	5.33	30.19	2.31	10.27
106-120	9.39	0.95	4.55	20.86	2.12	10.12
121-135	6.50	0.85	4.10	13.17	1.72	8.30
136 & above	8.11	1.32	7.36	19.66	3.60	17.83
Total	303.46	9.47	41.18	536.35	18.30	79.54

Table No. -43

TABLE SHOWING CHANGE IN BASAL AREA PER HA. IN DIFFERENT GIRTH CLASSES FROM 1984-86 ENUMERATIONS TO 2004-06

Girth Classes(cm)	1984-86	2004-06	Difference (+)	% increase
15-30	0.32	0.60	0.28	88%
31-45	0.82	1.35	0.53	65%
46-60	1.19	1.93	0.74	62%
61-75	1.41	2.22	0.81	57%
76-90	1.41	2.45	1.04	74%
91-105	1.20	2.31	1.11	93%
106-120	0.95	2.12	1.17	123%
121-135	0.85	1.72	0.87	102%
>135	1.32	3.60	2.28	173%
Total	9.47	18.30	8.83	93%

Table No. -44
TABLE SHOWING CHANGE IN GROWING STOCK PER HA. IN DIFFERENT GIRTH CLASSES FROM 1984-86 ENUMERATIONS TO 2004-06

Girth Classes(cm)	1984-86	2004-06	Difference (+)	% increase
15-30	1.05	2.01	0.96	91%
31-45	2.00	3.28	1.28	64%
46-60	3.72	6.05	2.33	63%
61-75	6.52	10.26	3.74	57%
76-90	6.55	11.42	4.87	74%
91-105	5.33	10.27	4.94	93%
106-120	4.55	10.12	5.57	122%
121-135	4.10	8.30	4.20	102%
>135	7.36	17.83	10.47	142%
Total	41.18	79.54	38.36	93%

The change in growing stock is significant. The main reasons for such change are: (i) The rest given to the stand, (ii) Conservative selection in silviculturally available trees leaving 50% not to be felled to have future safe guard, and (iii) not adherence to prescriptions of cleaning, cut back and singling of multiple coppice shoots in due course of time.

2.5.4. STOCK MAPPING:

Stock mapping of the tract was carried out by the staffs of Gadchiroli Forest Division (Territorial) under the guidance and supervision of Officers of Working Plan Division Chandrapur-1 during 2005-06. Details of results of stock mapping have been given in Appendix No. XLIV of Volume II.

Table No.45
STATEMENT SHOWING THE DISTRIBUTION OF STOCK IN SCI WORKING CIRCLES.

Site quality	Stock in Ha.
Teak-III	480.21
Teak-IV a	971.00
Teak-IV b	40.98
Plantation	2729.03
Misc-III	46396.68
Misc-IV a	32840.39
Misc-IV b	8317.76
Under stocked	790.81
Open Area & Encroachment Area	11890.73
River bed	0

2.5.5. DENSITY AND AGE CLASSES:

The density of the stock varies from 0.5 to 0.9 some under stocked areas intermingled with the fully stocked area. The age of the crop is all aged, mainly, middle to mature with patches of advanced growth and some over matured trees.

2.5.6. REGENERATION:

Natural regeneration is satisfactory in the areas allotted to this working circle. Regeneration is scanty near the villages due to biotic pressures, such as grazing, removal of fuel wood & small timber and occurrence of fire.

SECTION. 2.6. SILVICULTURAL SYSTEM:

2.6.1. The best suitable system to achieve the objectives will be Selection-cum-Improvement felling. Selection felling will allow the growth of left over trees to reach higher class above selection girth and improvement felling will allow the advance growth and establishment of natural regeneration. In most of the areas, natural regeneration is sufficient to restock the area. But in patches where the natural regeneration is not sufficient, suitable timber species will be planted. Besides, in suitable sites, stump planting of teak in gaps will be undertaken so that the overall percentage of teak becomes 10 to 15% in teak supporting areas. Bamboo will be planted at all suitable sites.

SECTION. 2. 7. CHOICE OF SPECIES:

2.7.1. As *teak* is the most valuable species, it will be given top priority wherever it occurs. In the existing crop, the miscellaneous species to be favoured in order of their priorities are *Bija, Shisham, Haldu, Ain, Kalam, Tiwas, Dhaoda, Khair, Aonla, Achar, Kulu, Moha, and Tendu* etc. However, in inferior areas with degraded soil, *Rohan, Bhirra, Khair, Garari and Lendia* will be preferred.

In the artificial regeneration, Teak will be planted in areas suitable for Teak and *Khair* will be planted in inferior areas. Besides, edible fruit and flowers yielding plants, *Semal* will also be reserved from felling. In the plantations some shade bearing trees like *Ficus, Umer* etc. will also be planted for the benefit of wildlife.

SECTION. 2. 8. HARVESTABLE GIRTH:

2.8.1. The study of growth pattern of *teak* had been carried out by stem analysis for site qualities II & III and *Khair* for site quality-III and details have been given in Appendix No. XIV of Volume II.

On the basis of analysis of growth of *teak* the harvestable girth of teak for site quality III and other valuable species has been fixed at 135 cm. For *Garari*, and *Lendia* the harvestable girth is fixed at 45 cm. and for *Khair* 75 cm. and for all other timber species it is fixed as 120cm. Harvestable girths are as follows:

Group-A	(i) Teak, Ain, Bija, Shisham, Haldu	135 cm.
Group- B	(iii) All other timber species	120 cm.
Group-C	(ii) Garari, Lendia	45 cm.
Group-D	(iii) Khair	75 cm.

In case of *Lendia* and *Garari* the harvestable girth has been fixed at 45 cm. Because *Lendia* and *Garari* have the character to establish fast and will not allow other species to come up. The stem becomes hollow when it reaches the girth of 45 cm and above. Moreover the utility of these species is for pole and fuel wood, hence its harvestable girth is fixed at 45cm. For *Khair*, selection girth has been fixed at 75 cm as; *Khair* tends to deteriorate when it reaches the girth of 75 cm and above.

SECTION-2.9: FELLING CYCLE:

Felling cycle has been fixed as 20 years. as that of previous working plan.

SECTION- 2.10: FORMATION OF FELLING SERIES AND COUPES:

2.10.1. The total area allotted to this Working Circle is 103556 .14 Ha, which is divided in to 52 felling series. Each felling series contains 20 coupes numbering as I to XX. The list of the felling series, felling series wise compartments and coupe wise area have been given in Appendix No.XXII & XXIII of volume II.

SECTION. 2. 11. REGULATION OF YIELD:

2.11.1. In previous working plan, the yield calculation for Selection Cum Improvement Working Circle was made on the basis of Sagreiya`s modification of Smythies` formula. Sagreiya`s modification of Brandis` formula formulae have been utilised for yield calculation in the present plan.

2.11.2. Mathematical analysis for K.P. Sagreiya`s modification of Brandis` Method of determining the sustainable and exploitable size of trees from all-aged forest is given as below;

If-

- (i) The number of trees in Class I (Exploitable Girth Class) is S_1 ;
- (ii) The number of trees in classes II, III ... are $s_2, s_3, \dots$;
- (iii) The fraction of the trees of classes II, III, ... that survive and are eventually available for harvesting as class trees are $x_2, x_3, \dots$, so that $x_2 s_2 = S_2$; $x_3 s_3 = S_3$; ...
- (iv) The trees take $Y_2, Y_3, \dots$ years in classes II, III, ..., so that the average annual recruitments in the class periods are-

$$S_2 / Y_2 = R_2$$

$$S_3 / Y_3 = R_3,$$

- (v) The overall average annual recruitment for the entire enumeration period, i.e.,
 $(S_2 + S_3 + \dots) / (Y_2 + Y_3 + \dots) = S/Y$ is say R .
- (vi) The felling cycle adopted is f years and
- (vii) The accruing average annual recruitment during the 1st, 2nd, ... Cycles is R' , R'' , ... , so that the recruitments, accruing in successive cycles, i.e. $f R'$, $f R''$, ... are given by as follows:

$$f R' = a R_x + (f - a) R_{x+1}$$

$$f R'' = b R_y + (f - b) R_{y+1}, \dots$$

Then the realizable recruitments R_{r1} , R_{r2} , ... in cycles I, II, ... Will be

$$R_{r1} = \frac{1}{2} [f R' - a (R' - R_x)],$$

$$R_{r1} = \frac{1}{2} [f R'' - a (f R'' - R_y)], \dots$$

Therefore, the prescribed yield should be –

$$I/f [S_1 + f R'/2 - a (R' - R_x)/2],$$

$$I/2f [S_2 + f (R' + R'')/2 - b (R'' - R_y)/2], \dots$$

According as the stock in hand has to be liquidated in 1, 2, ... cycles, to obtain the maximum sustained yield, while the actual recruitment is still less than R .

From this it follows that if the overall annual recruitment R is to be realized on a sustained basis even while the realizable recruitment in a cycle is less than R , there must be a stock in hand of –

$$S_I = f [R - R'/2] + a (R' - R_x)/2,$$

$$S_{II} = f [2R - (R' + R'')/2] + b (R'' - R_y)/2, \dots$$

Accordingly the deficiency continues for I, 2, 3, ... felling cycles. For the tract dealt with, the Selection Cum Improvement working Circle consisting of all aged forests.

2.11.3 GROUP A (Ain, Bija, Haldu, Shisham, Teak):

We have girth wise distribution of trees, years required to cross the class according to stem analysis of teak tree of Site Quality – I and selection girth fixed is 135 cm.

Table No.- 46

TABLE SHOWING THE PERIOD IN YEARS FOR WHICH A TREE REMAINS IN A GIRTH CLASS

Class	Girth Class in cm	Years in class	Symbol
A	B	C	D
	>150		
I	135-150	....	....
II	120-135	15	Y_2
III	106-120	14	Y_3
IV	91-105	14	Y_4
V	76-90	14	Y_5
VI	61-75	12	Y_6
VII	46-60	11	Y_7
VIII	31-45	10	Y_8
IX	15-30	7	Y_9
Total enumeration period		97	Y

Percentage of trees of different size classes that will attain exploitable size and silviculturally available for removal has been given in the following table.

Table No. - 47

Class	Girth Class (cm)	Trees/ha	Symbol	% of trees available in Class I	Symbol	Trees available in Class I	Symbol
A	B	C	D	E	F	G	H
	>150	3.82					
I	135-150	3.28		100%			
II	120-135	4.64	s_2	71%	x_2	3.28	S_2
III	106-120	6.74	s_3	49%	x_3	3.28	S_3
IV	91-105	8.11	s_4	40%	x_4	3.28	S_4
V	76-90	9.78	s_5	34%	x_5	3.28	S_5
VI	61-75	10.4	s_6	32%	x_6	3.28	S_6
VII	46-60	11.91	s_7	28%	x_7	3.28	S_7
VIII	31-45	15.22	s_8	22%	x_8	3.28	S_8
IX	15-30	18.4	s_9	18%	x_9	3.28	S_9
	Total	92.32				26.24	S

As the total recruitment for the enumeration period Y is S the mean yearly recruitment S/Y , say R is $26.24 / 97 = 0.27$ per ha. The average annual recruitment

during the size class period namely, $S_2/ Y_2 = R_2$, $S_3/ Y_3 = R_3$, ...is given in the following table.

Table No.-48

Class	Girth Class in cm	No of trees / ha	Years in class	Symbol	Annual recruitment to next class	Symbol
A	B	C	D	E	F	G
I	Over 135	7.1	....	....		
II	120-135	3.28	15	Y_2	0.22	R_2
III	106-120	3.28	14	Y_3	0.23	R_3
IV	91-105	3.28	14	Y_4	0.23	R_4
V	76-90	3.28	14	Y_5	0.23	R_5
VI	61-75	3.28	12	Y_6	0.27	R_6
VII	46-60	3.28	11	Y_7	0.30	R_7
VIII	31-45	3.28	10	Y_8	0.33	R_8
IX	15-30	3.28	7	Y_9	0.47	R_9
		26.24	97	Y	0.27	R

It is obvious that although there is stock in hand of $(3.82+3.28 = 7.10)$ class I trees/ha and there will be a recruitment of 26.24 trees/a in the 97 years and thus theoretically annual yield of $(26.24 + 7.10) / 97 = 0.34$ trees/ha is obtainable. In practice, as the existing stock is assumed to be distributed uniformly and one ha of the forests to be worked in a year, the total class I trees available in it at the end of the first year will be only $(S_1 + R_2)$.

Of these , all the S_1 existing class I trees will be available for removal, but when felling proceed from one end of the annual area to the other, only half of the recruitment or $R_2/2$ trees that will come into class I in one year over the whole coupe, will be realizable, remaining trees will be passing into class I after the fellings have gone past a particular spot. In other words the total realizable yield from the year's coupe will be only $\{S_1 + R_2/2\}$ trees / ha. Similarly when 1st coupe area is gone over in the second year, for 2nd coupe, before fellings commence it will have in it S_1 of existing class I trees as also one year's recruitment namely, R_2 trees, all of which will be available for removal. Besides this as in Coupe I one-half of the year's recruitment $R_2/2$ will also be available. Thus in 2nd coupe trees available per ha would be $\{S_1 + R_2 + R_2/2\}$.and so on.

Thus for one ha area of each coupe, realizable and accumulating Class I for entire felling cycle trees would be as follows in table no-41.

Table No. -49

(For Proposed Plan Felling Cycle of 20 years; n th year of operation; No of trees per ha)

SrNo	Coupe No	For coupe area in ha	nth year of operation	Class I at hand= S_1	Realizable Recruitment = $(n-1/2) R_2$	Accruing Recruitment=
1	I	1	1	7.10	$\frac{1}{2}R_2 = 0.11$	$15R_2 + 4R_3 + \frac{1}{2} R_3 = 4.33$
2	II	1	2	7.10	$R_2 + \frac{1}{2} R_2 = 0.33$	$15R_2 + 3R_3 + \frac{1}{2} R_3 = 4.13$
3	III	1	3	7.10	$2R_2 + \frac{1}{2} R_2 = 0.55$	$15R_2 + 2R_3 + \frac{1}{2} R_3 = 3.88$
4	IV	1	4	7.10	$3R_2 + \frac{1}{2} R_2 = 0.77$	$15R_2 + R_3 + \frac{1}{2} R_3 = 3.65$
5	V	1	5	7.10	$4R_2 + \frac{1}{2} R_2 = 0.99$	$15R_2 + \frac{1}{2} R_3 = 3.42$
6	VI	1	6	7.10	$5R_2 + \frac{1}{2} R_2 = 1.21$	$14R_2 + \frac{1}{2} R_2 = 3.19$
7	VII	1	7	7.10	$6R_2 + \frac{1}{2} R_2 = 1.43$	$13R_2 + \frac{1}{2} R_2 = 2.97$
8	VIII	1	8	7.10	$7R_2 + \frac{1}{2} R_2 = 1.65$	$12R_2 + \frac{1}{2} R_2 = 2.75$
9	IX	1	9	7.10	$8R_2 + \frac{1}{2} R_2 = 1.87$	$11R_2 + \frac{1}{2} R_2 = 2.53$
10	X	1	10	7.10	$9R_2 + \frac{1}{2} R_2 = 2.09$	$10R_2 + \frac{1}{2} R_2 = 2.31$
11	XI	1	11	7.10	$10R_2 + \frac{1}{2} R_2 = 2.31$	$9R_2 + \frac{1}{2} R_2 = 2.09$
12	XII	1	12	7.10	$11R_2 + \frac{1}{2} R_2 = 2.53$	$8R_2 + \frac{1}{2} R_2 = 1.87$
13	XIII	1	13	7.10	$12R_2 + \frac{1}{2} R_2 = 2.75$	$7R_2 + \frac{1}{2} R_2 = 1.65$
14	XIV	1	14	7.10	$13R_2 + \frac{1}{2} R_2 = 2.97$	$6R_2 + \frac{1}{2} R_2 = 1.43$
15	XV	1	15	7.10	$14R_2 + \frac{1}{2} R_2 = 3.19$	$5R_2 + \frac{1}{2} R_2 = 1.21$
16	XVI	1	16	7.10	$15R_2 + \frac{1}{2} R_3 = 3.42$	$4R_2 + \frac{1}{2} R_2 = 0.99$
17	XVII	1	17	7.10	$15R_2 + R_3 + \frac{1}{2} R_3 = 3.65$	$3R_2 + \frac{1}{2} R_2 = 0.77$
18	XVIII	1	18	7.10	$15R_2 + 2R_3 + \frac{1}{2} R_3 = 3.88$	$2R_2 + \frac{1}{2} R_2 = 0.55$
19	XIX	1	19	7.10	$15R_2 + 3R_3 + \frac{1}{2} R_3 = 4.13$	$R_2 + \frac{1}{2} R_2 = 0.33$
20	XX	1	20	7.10	$15R_2 + 4R_3 + \frac{1}{2} R_3 = 4.36$	$\frac{1}{2}R_2 = 0.11$
	Total	20		142.00	44.19	44.19
		1	Average	7.10	2.21	2.21

Thus overall average number trees per ha will be $7.10 + 2.21 + 2.21 = 11.52$. Out of which available for selection felling would be $7.10 + 2.21 = 9.31$. Percentage removal would be $9.31/11.52\% = 81\%$. Following the Guidelines of Government of India regarding the removal of 50% of normal available yield, the average annual yield will be 40.5%. For sake of simplicity say 40% of silviculturally available tree i.e. on average 40% of $11.52 = 4.61$ say 5 trees per ha. In terms of number, 4 out of 10 silviculturally available trees will be marked for felling. Taking form factor of tree in girth class 135-150 as timber = 0.485 cubic meter, we will have average annual yield = $5 \times 0.485 / 20 = 0.12$ cubic meter per hectare per annum of timber. For fuelwood, average annual Yield will be = $5 \times 0.330 / 20 = 0.08$ fuelwood per ha per annum.

2.11.4 GROUP B (Other species : Selection Girth = 120 cm):

Table No.-50
TABLE SHOWING THE PERIOD IN YEARS FOR WHICH A TREE REMAINS IN A GIRTH CLASS

Class	Girth Class in cm	Years in class	Symbol
A	B	C	D
	>135		
I	120-135	....	....
II	106-120	14	Y_2
III	91-105	14	Y_3
IV	76-90	14	Y_4
V	61-75	12	Y_5
VI	46-60	11	Y_6
VII	31-45	10	Y_7
VIII	15-30	7	Y_8
Total enumeration period		82	Y

Percentage of trees of different size classes that will attain exploitable size and silviculturally available for removal has been given in the following table.

Table No.-51

Class	Girth Class (cm)	Trees/ha	Symbol	% of trees available as Class I		Trees available as Class I	Symbol
A	B	C	D	E	F	G	H
	>135	12.25					
I	120-135	8.04		100%			
II	106-120	12.63	s_2	64%	x_2	8.08	S_2
III	91-105	18.32	s_3	44%	x_3	8.06	S_3
IV	76-90	26.42	s_4	30%	x_4	7.93	S_4
V	61-75	47.40	s_5	17%	x_5	8.06	S_5
VI	46-60	46.48	s_6	17%	x_6	7.9	S_6
VII	31-45	62.49	s_7	13%	x_7	8.12	S_7
VIII	15-30	72.33	s_8	11%	x_8	7.96	S_8
	Total	294.33				56.11	S

As the total recruitment for the enumeration period Y is S the mean yearly recruitment S/Y , say R is $56.11 / 82 = 0.68$ per ha. The average annual recruitment during the size class period namely, $S_2 / Y_2 = R_2$, $S_3 / Y_3 = R_3$, ... will be as follows in the following table.

Table No.-52

Class	Girth Class in cm	No of trees / ha	Years in class	Symb ol	Annual recruitment to next class	Symbol
A	B	C	D	E	F	G
I	>120	20.29	....	....		
II	106-120	12.63	14	Y_2	0.58	R_2
III	91-105	18.32	14	Y_3	0.58	R_3
IV	76-90	26.42	14	Y_4	0.57	R_4
V	61-75	47.40	12	Y_5	0.67	R_5
VI	46-60	46.48	11	Y_6	0.72	R_6
VII	31-45	62.49	10	Y_7	0.82	R_7
VIII	15-30	72.33	7	Y_8	1.14	R_8
		294.36	82	Y	0.68	R

It is obvious that although there is stock in hand of $(12.25+8.04 = 20.29)$ class I trees/ha and there will be a recruitment of 56.11 trees/a in the 82 years and thus theoretically annual yield of $(20.29 + 56.11) / 82 = 0.93$ trees/ha is obtainable. As discussed for Group A species, for one ha area of each coupe, realizable and accumulating Class I for group B species, entire felling cycle trees would be as follows in the table given below.

Table No. - 53

(For Proposed Plan Felling Cycle of 20 years; n th year of operation; No of trees per ha)

SrNo	Coupe No	For coupe area in ha	nth year of operation	Class I at hand= S_1	Realizable Recruitment = $(n-1/2) R_2$	Accruing Recruitment=
1	I	1	1	20.29	$\frac{1}{2}R_2 = 0.29$	$15R_2 + 4R_3 + \frac{1}{2}R_3 = 11.33$
2	II	1	2	20.29	$R_2 + \frac{1}{2}R_2 = 0.87$	$15R_2 + 3R_3 + \frac{1}{2}R_3 = 10.73$
3	III	1	3	20.29	$2R_2 + \frac{1}{2}R_2 = 1.45$	$15R_2 + 2R_3 + \frac{1}{2}R_3 = 10.15$
4	IV	1	4	20.29	$3R_2 + \frac{1}{2}R_2 = 2.03$	$15R_2 + R_3 + \frac{1}{2}R_3 = 9.57$
5	V	1	5	20.29	$4R_2 + \frac{1}{2}R_2 = 2.61$	$15R_2 + \frac{1}{2}R_3 = 8.99$
6	VI	1	6	20.29	$5R_2 + \frac{1}{2}R_2 = 3.19$	$14R_2 + \frac{1}{2}R_2 = 8.41$
7	VII	1	7	20.29	$6R_2 + \frac{1}{2}R_2 = 3.77$	$13R_2 + \frac{1}{2}R_2 = 7.83$
8	VIII	1	8	20.29	$7R_2 + \frac{1}{2}R_2 = 4.35$	$12R_2 + \frac{1}{2}R_2 = 7.25$
9	IX	1	9	20.29	$8R_2 + \frac{1}{2}R_2 = 4.93$	$11R_2 + \frac{1}{2}R_2 = 6.67$
10	X	1	10	20.29	$9R_2 + \frac{1}{2}R_2 = 5.51$	$10R_2 + \frac{1}{2}R_2 = 6.09$
11	XI	1	11	20.29	$10R_2 + \frac{1}{2}R_2 = 6.09$	$9R_2 + \frac{1}{2}R_2 = 5.51$
12	XII	1	12	20.29	$11R_2 + \frac{1}{2}R_2 = 6.67$	$8R_2 + \frac{1}{2}R_2 = 4.93$
13	XIII	1	13	20.29	$12R_2 + \frac{1}{2}R_2 = 7.25$	$7R_2 + \frac{1}{2}R_2 = 4.35$
14	XIV	1	14	20.29	$13R_2 + \frac{1}{2}R_2 = 7.83$	$6R_2 + \frac{1}{2}R_2 = 3.77$
15	XV	1	15	20.29	$14R_2 + \frac{1}{2}R_2 = 8.41$	$5R_2 + \frac{1}{2}R_2 = 3.19$
16	XVI	1	16	20.29	$15R_2 + \frac{1}{2}R_3 = 8.99$	$4R_2 + \frac{1}{2}R_2 = 0.2.61$
17	XVII	1	17	20.29	$15R_2 + R_3 + \frac{1}{2}R_3 = 9.57$	$3R_2 + \frac{1}{2}R_2 = 0.2.03$
18	XVIII	1	18	20.29	$15R_2 + 2R_3 + \frac{1}{2}R_3$	$2R_2 + \frac{1}{2}R_2 = 0.1.45$

					=10.15	
19	XIX	1	19	20.29	$15R_2 + 3R_3 + \frac{1}{2} R_3$ =10.73	$R_2 + \frac{1}{2} R_2 = 0.87$
20	XX	1	20	20.29	$15R_2 + 4R_3 + \frac{1}{2} R_3$ =11.33	$\frac{1}{2}R_2 = 0.29$
	Total	20		405.80	116.00	116.00
			Average	20.29	5.80	5.58

Thus overall average number trees per ha will be $20.29 + 5.80 + 5.80 = 31.89$. Out of which available for selection felling would be $20.29 + 5.80 = 26.09$. Percentage removal would be $26.09/31.89\% = 86\%$. Following the Guidelines of Government of India regarding the removal of 43% of normal available yield, the average annual yield will be 43%. On average 47% of $31.89 = 14.99$ say 15 trees per ha. In terms of number, 47 out of 100 silviculturally available trees will be marked for felling. Taking form factor of tree in girth class 120 as timber = 0.400 cubic meter, we will have average annual yield = $15 \times 0.400 / 20 = 0.30$ cubic meter per hectare per annum. For fuelwood, average annual Yield will be = $15 \times 0.230 / 20 = 0.17$ fuelwood per hectare per annum.

2.11.5 GROUP C (Garari and lendia selection girth = 45 cm):

Table No.-54

TABLE SHOWING THE PERIOD IN YEARS FOR WHICH A TREE REMAINS IN A GIRTH CLASS

Class	Girth Class in cm	Years in class	Symbol
A	B	C	D
	>60		
I	46-60	---	....
II	31-45	10	Y_2
III	15-30	7	Y_3
Total enumeration period		17	Y

Percentage of trees of different size classes that will attain exploitable size and silviculturally available for removal will be as follows in table no-47.

Table No. -55

Class	Girth Class (cm)	Trees/ ha	Symbol	% of trees available as Class I	Symbol	Trees available as Class I	Symbol
A	B	C	D	E	F	G	H
	>60	28.41					
I	45-60	22.90					
II	30-45	35.94	s_2	64%	x_2	23.00	S_2
III	15-30	48.93	s_3	47%	x_3	23.00	S_3
	Total	136.18				46.00	S

As the total recruitment for the enumeration period Y is S the mean yearly recruitment S/Y , say R is $56.11 / 82 = 0.68$ per ha. The average annual recruitment during the size class period namely, $S_2/Y_2 = R_2$, $S_3/Y_3 = R_3$, ... will be as follows in the table given below.

Table No.-56

Class	Girth Class in cm	No of trees / ha	Years in class	Symbol	Annual recruitment to next class	Symbol
A	B	C	D	E	F	G
I	>60	28.41	....	....		
II	45-60	22.90				
III	30-45	35.94	10	Y_2	2.30	R_2
IV	15-30	48.93	7	Y_3	3.29	R_3
		136.18	17	Y	2.71	R

It is obvious that although there is stock in hand of $(28.41+22.90 = 51.31)$ class I trees/ha and there will be a recruitment of 46 trees/a in the 17 years and thus theoretically annual yield of $(51.31 +46.00) / 17 = 5.72$ trees/ha is obtainable. As discussed for Group A species, for one ha area of each coupe, realizable and accumulating Class I for group C species, entire felling cycle trees would be as follows in the table given below.

Table No.- 57

(For Proposed Plan Felling Cycle of 20 years; n th year of operation; No of trees per ha)

SrNo	Coupe No	For coupe area in ha	nth year of operation	Class I at hand= S_1	Realizable Recruitment = $(n-1/2) R_2$	Accruing Recruitment=
1	I	1	1	51.31	$\frac{1}{2}R_2 = 1.15$	$10R_2 + 7R_3 + 2\frac{1}{2} R_3 = 71.63$
2	II	1	2	51.31	$R_2 + \frac{1}{2} R_2 = 3.45$	$10R_2 + 7R_3 + 2\frac{1}{2} R_3 = 71.63$
3	III	1	3	51.31	$2R_2 + \frac{1}{2} R_2 = 5.75$	$10R_2 + 7R_3 + \frac{1}{2} R_3 = 53.39$
4	IV	1	4	51.31	$3R_2 + \frac{1}{2} R_2 = 8.05$	$10R_2 + 6\frac{1}{2} R_2 = 47.68$
5	V	1	5	51.31	$4R_2 + \frac{1}{2} R_2 = 10.35$	$10R_2 + 5\frac{1}{2} R_2 = 44.39$
6	VI	1	6	51.31	$5R_2 + \frac{1}{2} R_2 = 12.65$	$10R_2 + 4\frac{1}{2} R_2 = 41.10$
7	VII	1	7	51.31	$6R_2 + \frac{1}{2} R_2 = 14.95$	$10R_2 + 3\frac{1}{2} R_2 = 37.81$
8	VIII	1	8	51.31	$7R_2 + \frac{1}{2} R_2 = 17.25$	$10R_2 + 2\frac{1}{2} R_2 = 34.52$
9	IX	1	9	51.31	$8R_2 + \frac{1}{2} R_2 = 19.55$	$10R_2 + 1\frac{1}{2} R_2 = 31.23$
10	X	1	10	51.31	$9R_2 + \frac{1}{2} R_2 = 24.65$	$10R_2 + \frac{1}{2} R_3 = 27.94$
11	XI	1	11	51.31	$10R_2 + \frac{1}{2} R_3 = 27.94$	$9R_2 + \frac{1}{2} R_2 = 24.65$

12	XII	1	12	51.31	$10R_2 + 1 \frac{1}{2} R_2 = 31.23$	$8R_2 + \frac{1}{2} R_2 = 19.55$
13	XIII	1	13	51.31	$10R_2 + 2 \frac{1}{2} R_2 = 34.52$	$7R_2 + \frac{1}{2} R_2 = 17.25$
14	XIV	1	14	51.31	$10R_2 + 3 \frac{1}{2} R_2 = 37.81$	$6R_2 + \frac{1}{2} R_2 = 14.95$
15	XV	1	15	51.31	$10R_2 + 4 \frac{1}{2} R_2 = 41.10$	$5R_2 + \frac{1}{2} R_2 = 12.65$
16	XVI	1	16	51.31	$10R_2 + 5 \frac{1}{2} R_2 = 44.39$	$4R_2 + \frac{1}{2} R_2 = 10.35$
17	XVII	1	17	51.31	$10R_2 + 6 \frac{1}{2} R_2 = 47.68$	$3R_2 + \frac{1}{2} R_2 = 8.05$
18	XVIII	1	18	51.31	$10R_2 + 7R_3 + \frac{1}{2} R_3 = 53.39$	$2R_2 + \frac{1}{2} R_2 = 0.1.45$
19	XIX	1	19	51.31	$10R_2 + 7R_3 + 1 \frac{1}{2} R_3 = 62.51$	$R_2 + \frac{1}{2} R_2 = 0.87$
20	XX	1	20	51.31	$10R_2 + 7R_3 + 2 \frac{1}{2} R_3 = 71.63$	$\frac{1}{2} R_2 = 1.15$
	Total	20		1026.2	570.00	570.00
		1	Average	51.31	28.50	28.50

Thus overall average number trees per ha will be $51.31 + 28.50 + 28.50 = 108.31$. Out of which available for selection felling would be $51.31 + 28.50 = 79.81$. Percentage removal would be $79.81/108.31\% = 74\%$. Following the Guidelines of Government of India regarding the removal of 50% of normal available yield, the average annual yield will be 37%. For sake of simplicity say 35% of silviculturally available tree i.e. on average 35% of $108.31 = 38$ trees per ha. Taking form factor of tree in girth class 45-60 as timber = 0.070 cubic meter, we will have average annual yield = $38 \times 0.07/20 = 0.133$ cubic meter per hectare per annum. The production will be fuelwood.

2.11.6 GROUP D (*Khair*; selection girth = 75 cm):

Table No.-58

TABLE SHOWING THE PERIOD IN YEARS FOR WHICH A TREE REMAINS IN A GIRTH CLASS

Class	Girth Class in cm	Years in class	Symbol
A	B	C	D
	>90	---	---
I	75-90	---	---
II	60-75	14	Y_2
III	46-60	12	Y_3
IV	31-45	10	Y_4
V	15-30	7	Y_5
Total enumeration period		43	Y

Percentage of trees of different size classes that will attain exploitable size and silviculturally available for removal has been given in the following table.

Table No. -59

2.61	2.61	1.41	0.69	0.33	0.10	0.07	0.01	0.01	0.00	7.84

Class	Girth Class (cm)	Trees/ ha	Symbol	%of trees available as Class I	Symbol	Trees available as Class I	Symbol
A	B	C	D	E	F	G	H
	>90	0.19	---	---	---		---
I	75-90	0.33	---	100%	---		---
II	60-75	0.69	S ₂	48%	x ₂	0.33	S ₂
III	45-60	1.41	S ₃	23%	x ₃	0.32	S ₃
IV	30-45	2.61	S ₄	13%	x ₄	0.34	S ₄
V	15-30	2.61	S ₅	13%	x ₅	0.34	S ₅
	Total	7.84				1.33	S

As the total recruitment for the enumeration period Y is S the mean yearly recruitment S/Y , say R is $1.33 / 43 = 0.03$ per ha. The average annual recruitment during the size class period namely, $S_2/ Y_2 = R_2$, $S_3/ Y_3 = R_3$, ... will be as follows in the table given below.

Table No.-60

Class	Girth Class in cm	No of trees / ha	Years in class	Symbol	Annual recruitment to next class	Symbol
A	B	C	D	E	F	G
	>90	0.19	....	....		
I	75-90	0.33				
II	60-75	0.69	14	Y ₂	0.024	R ₂
III	45-60	1.41	12	Y ₃	0.027	R ₃
IV	30-45	2.61	10	Y ₄	0.034	R ₄
V	15-30	2.61	7	Y ₅	0.049	R ₅
		7.84	43	Y	0.031	R

It is obvious that although there is stock in hand of $(0.19+0.33 = 0.52)$ class I trees/ha and there will be a recruitment of 1.33 trees/a in the 43 years and thus theoretically annual yield of $(0.52 + 1.33) / 17 = 0.043$ trees/ha is obtainable. As discussed for Group A species, for one ha area of each coupe, realizable and accumulating Class I for group C species, entire felling cycle trees would be as follows in the table given below.

Table No. -61

(For Proposed Plan Felling Cycle of 20 years; n th year of operation; No of trees per ha)

SrNo	Coupe No	For coupe area in ha	nth year of operation	Class I at hand= S_1	Realizable Recruitment = $(n-1/2) R_2$	Accruing Recruitment=
1	I	1	1	0.52	$\frac{1}{2}R_2 = 0.012$	$14R_2 + 5\frac{1}{2} R_3 = 0.485$
2	II	1	2	0.52	$1\frac{1}{2} R_2 = 0.036$	$14R_2 + 4\frac{1}{2} R_3 = 0.458$
3	III	1	3	0.52	$2\frac{1}{2} R_2 = 0.060$	$14R_2 + 3\frac{1}{2} R_3 = 0.431$
4	IV	1	4	0.52	$3\frac{1}{2} R_2 = 0.084$	$14R_2 + 2\frac{1}{2} R_2 = 0.404$
5	V	1	5	0.52	$4\frac{1}{2} R_2 = 0.108$	$14R_2 + 1\frac{1}{2} R_2 = 0.377$
6	VI	1	6	0.52	$5\frac{1}{2} R_2 = 0.132$	$14 R_2 + \frac{1}{2} R_3 = 0.350$
7	VII	1	7	0.52	$6\frac{1}{2} R_2 = 0.156$	$13\frac{1}{2} R_2 = 0.324$
8	VIII	1	8	0.52	$7\frac{1}{2} R_2 = 0.180$	$12\frac{1}{2} R_2 = 0.300$
9	IX	1	9	0.52	$8\frac{1}{2} R_2 = 0.204$	$11\frac{1}{2} R_2 = 0.276$
10	XX	1	10	0.52	$9\frac{1}{2} R_2 = 0.228$	$10\frac{1}{2} R_3 = 0.252$
11	XI	1	11	0.52	$10\frac{1}{2} R_3 = 0.252$	$9\frac{1}{2} R_2 = 0.228$
12	XII	1	12	0.52	$11\frac{1}{2} R_2 = 0.276$	$8\frac{1}{2} R_2 = 0.204$
13	XIII	1	13	0.52	$12\frac{1}{2} R_2 = 0.300$	$7\frac{1}{2} R_2 = 0.180$
14	XIV	1	14	0.52	$13\frac{1}{2} R_2 = 0.324$	$6\frac{1}{2} R_2 = 0.156$
15	XV	1	15	0.52	$14 R_2 + \frac{1}{2} R_3 = 0.350$	$5\frac{1}{2} R_2 = 0.132$
16	XVI	1	16	0.52	$14R_2 + 1\frac{1}{2} R_2 = 0.377$	$4\frac{1}{2} R_2 = 0.108$
17	XVII	1	17	0.52	$14R_2 + 2\frac{1}{2} R_2 = 0.404$	$3\frac{1}{2} R_2 = 0.084$
18	XVIII	1	18	0.52	$14R_2 + 3\frac{1}{2} R_3 = 0.431$	$2\frac{1}{2} R_2 = 0.060$
19	XIX	1	19	0.52	$14R_2 + 4\frac{1}{2} R_3 = 0.458$	$1\frac{1}{2} R_2 = 0.036$
20	XX	1	20	0.52	$14R_2 + 5\frac{1}{2} R_3 = 0.485$	$\frac{1}{2}R_2 = 0.012$
	Total	20		10.4	4.857	4.857
			Average	0.52	0.24	0.24

Thus overall average number trees per ha will be $0.52 + 0.24 + 0.24 = 1.00$. Out of which available for selection felling would be $0.52 + 0.24 = 0.76$. Percentage removal would be $0.76/1.00\% = 76\%$. Following the Guidelines of Government of India regarding the removal of 50% of normal available yield, the average annual yield will be 38%. For the sake of simplicity say 40% of silviculturally available tree i.e. on average 40% of $1.00 = 0.40$ trees per ha. Taking form factor of tree in girth class 45-60 as timber = 0.165 cubic meter, we will have average annual yield = $0.40 \times 0.165 / 20 = 0.003$ cubic meter per hectare per annum. For fuel wood form factor is 0.090. Yield of firewood is $0.40 \times 0.090 / 20 = 0.002$ fuel beat/ha/annum.

ABSTRACT OF YIELD CALCULATION

Group of spp	A	B	C	D	For one ha	For this working circle the Area allotted is 105,593.80 ha
Number of stem/ha	5	15	38	0.40	58.4	
Selection Girth	135	120	45	75		
Form Factor Timber	0.485	0.400	0.070	0.165		
Form Factor Fuelwood	0.330	0.230	0.000	0.090		
Timber	0.12	0.30	0.133	0.003	0.556	58,700 cubic meter
Fuelwood	0.06	0.17	0.00	0.002	0.232	24,500 fuel beat
Total	0.18	0.47	0.133	0.005	0.788	83,200 say 83000 cubic meter

SECTION-2.12: AGENCY OF HARVESTING

2.12.1. Demarcation of coupes and marking of trees for felling will be carried out departmentally. The main felling of coupes will either be worked departmentally or through F.L.C.S. However, subsidiary silvicultural operations such as thinning, cutback operations, and soil and moisture conservation works, planting and fire protection works will be done departmentally.

SECTION-2.13: DEMARCATION OF COUPES, PREPARATION OF TREATMENT MAPS AND MARKING TECHNIQUES.

2.13.1. DEMARCATION:

Except 1st coupe due for working, the rest of the coupes will be demarcated one year in advance of the main felling as per sequence given in the Appendix no. XXIII of volume II. The 1st coupe due for working will be demarcated, marking of trees will be carried out and felling will be executed during first year of the plan to streamline the working of annual coupes. Demarcation and marking will be carried out as per the prescriptions given in the Chapter "Other Important Regulations".

2.13.2. PREPARATION OF TREATMENT MAP:

After demarcation of the coupe, treatment map will be prepared by the Range Forest Officer and will be verified by Assistant Conservator of Forests. The Deputy Conservator of Forests will also inspect demarcation and marking of some of the coupes. The treatment map will show the following type of areas.

2.13.3. TYPE A – PROTECTED AREA:

It includes the following areas.

- (i) Areas with steep slopes more than 25°.
- (ii) Areas eroded or liable for erosion.
- (iii) 20-meter wide strip on both sides of the watercourse.
- (iv) Riparian Zones.

2.13.4. TYPE-B: UNDER STOCKED AREAS.

It includes the areas with crop density less than 0.4 but exceeding 2 ha in extent at one place.

2.13.5. TYPE-C:**OLD PLANTATIONS AND GROUP OF YOUNG POLES**

It includes patches of young pole crops of *teak* and other miscellaneous species suitable for retention as a future crop in addition to old plantations. The patch will not be less than one hectare. In these patches spacing between poles will be done for better growth. Thinning will be done as per the quality classes and year of plantation. The number of stems will be retained as per yield table. Thinning sequence of old *teak* plantation is given in Appendix No.XXXII.

2.13.6. TYPE- D- WELL STOCKED AREAS

Areas with crown density above 0.4 will be included in this category.

2.13.7. To facilitate the preparation of treatment map each coupe in general will be divided into 4 sections. Each type of area will be marked only if its, extent at one place is more than 5 ha. The treatment map will be submitted to the DY.C.F. Gadchiroli who after careful scrutiny, will approve the same and will be sent to the RFO for compliance. No area will be treated as unworkable as some kinds of works will be required to be carried out in each type of the areas mentioned above.

2.13.8. TREATMENT

Following types of treatment will be given to areas as classified above. If necessary, nala bunding and gully plugging will be done in the entire area of the coupe as per treatment map. The area wise treatments proposed are as follows.

- i) **Type A - Protection Area:** No marking will be done and hence felling is not prescribed.

ii) **Type B–Under-Stocked Area:** No marking will be done except

- i) All dead trees after retaining two dead trees per ha.
- ii) All live high stumps
- iii) All but one vigorously growing coppice shoot/stool.

iii) **Type C – Pole Crop or old plantations:**

No planting will be done. Thinning will be done in the young natural pole crop to create space between the remaining trees to 1/3 of the average height as a thumb rule. The *Teak* plantation areas will be treated as per the prescriptions given in “Afforestation Working Circle (Para 4.15.4)” of this plan.

iv) **Type D - Well Stocked Areas:**

No planting will be done. Felling will be carried out as provided under Marking Rules and cut back operations will follow the main felling as per the sequence given **Appendix no. XXIV of volume II.**

2.13.9.MARKING RULES AND MARKING TECHNIQUES:

2.13.9.1. Marking Rules:

Marking will be done in the same year in which demarcation has been done. Before actual marking, at least 2 sample plots of size 60m X 60 m in each section of the coupe will be laid. Sample plots should not be at the periphery of the coupe. The distance between the centers of the two sample plots should not be less than 200 m. In sample plots complete enumeration of trees of approaching girth class and above selection girth will be done and the data will be compiled to determine the number of trees available for marking for felling.

2.13.9.2. Then the site quality will be determined. In the same coupe, if a patch of more than 5 ha is having different site quality, the enumeration data should be collected separately. The abstract of enumeration data will be prepared site quality wise. Then the number of trees to be removed from harvestable girth class is determined on the basis of availability of trees from different species. In marking of the above surplus and mature trees, silvicultural, social and financial aspects of the species should be taken into account.

2.13.9.3. Marking technique has been described in detail in the chapter “Other Important Regulations”.

2.13.9.4. The marking rules for each type of area is prescribed as follows-

- (i) **TYPE – A- PROTECTED AREAS:** No marking shall be done, as felling is not prescribed. Dead trees will be removed leaving two dead trees per hectare for wildlife purpose. Bush sowing of suitable species will be carried out by the beat guards/van majoors.

(ii) **TYPE – B- UNDERSTOCKED AREAS.** No Marking will not be done except

- i) All dead trees after retaining two dead trees per ha.
- ii) All live high stumps to be cut close to the ground and dressed.
- iii) All but one vigorously growing coppice shoots of valuable species.
- iv) Malformed stumps and seedlings will be cut.

(iii) **TYPE-C: (a) POLE CROP:** Natural pole crop of not less than one hectare will be thinned in such a way that an average spacing of 1/3 of height of poles shall be maintained. The healthy poles will be retained.

(b) PLANTATION: Artificially raised pole crop will be thinned as per thinning schedule given in Appendix-XXXII.

(iv) **TYPE – D- WELL STOCKED AREA.** All edible fruit yielding trees will be reserved from felling.

- a) All the trees above selection girth will be enumerated in 15 cm girth classes.
- b) Climbers will be cut
- c) All but one vigorously growing coppice shoot per stool where density is less, otherwise all coppice shoots will be marked for felling.
- d) Trees including teak preferably of coppice origin, above the harvestable girth will be marked for felling as prescribed under yield regulation. Those harvestable trees, which hinder the growth of seedling regeneration of the desired species, will be removed in preference to others after that felling of trees will be done first from the highest girth class and then next below and so on. Due care should be taken to remove trees of coppice origin while retaining the trees of seed origin as far as possible. The trees, which are not likely to survive till the next felling cycle, will be preferred for removal.
- e) Irrespective of girth class, all malformed and dead trees will be marked for felling. Malformed tree means that a tree malformed when it is defective or abnormal either in crown or bole, which include conditions like slag headedness, crookedness, gnaris, twist or constrictions by climbers beyond recouplement etc.
- f) All yields should be regulated under the expected yield with $\pm 10\%$ variation.

SECTION- 2. 14: SOIL AND MOISTURE CONSERVATION WORKS:

2.14.1. The soil and moisture conservation works will be taken up along with marking operation and completed before onset of monsoon. The soil and moisture conservation works will include gully plugging, nala bunding etc. These works will

be taken up after preparation of a detailed treatment map of the area and the estimate of soil and moisture conservation works duly sanctioned by the competent authority.

SECTION-2.15: REGENERATION:

2.15.1. AREAS WITH ADEQUATE NATURAL REGENERATION:

In the year following the year of main felling, the naturally regenerated seedlings will be spaced out uniformly by removing all under growth so that the number of seedlings per ha will be as required by the normal stand table for a given site and composition of the crop. The miscellaneous species to be favored in order of priorities are *Shisham*, *Bija*, *Haldu*, *Ain Kalamb*, *Tiwas*, *Dhaoda*, *Bhirra*, *Rohan*, *Garari* and *Lendia*. These seedlings will be treated on par with the planted seedlings. Three weedings and soil working will be carried out around all the seedlings. Tending, singling and cleaning operations will also be done.

2.15.2. AREAS WITH INADEQUATE NATURAL REGENERATION:

In such areas artificial regeneration will be taken in the year following the year of main felling. The pre-monsoon works will be taken in the year of main felling. In plantations 10 to 15% of teak, in suitable areas, and other locally available superior miscellaneous species as mentioned above will be preferred. Planting techniques have been given in the Chapter "Other Regulations"

SECTION-2.16: SUBSIDIARY SILVICULTURAL OPERATIONS:

2.16.1. These works will be carried out in the subsequent years of the main felling. These works will be carried out departmentally as below.

2.16.2. CUTTING BACK OPERATION (CBO):

CBO will be carried out in the next year of main felling. The operations will be confined only to D type areas. These operations are listed below.

- i) All standing trees marked for felling but not felled will be felled.
- ii) All damaged trees, during felling which are not likely to recover, will be cut back.
- iii) All climbers interfering with the growth of regeneration will be removed.
- iv) All growth of inferior species, which are likely to interfere with the growth of teak and valuable miscellaneous species, will be cut.
- v) All malformed, suppressed and damaged advanced growth will be cut back.

2.16.3.CLEANING:

Cleaning operations will be carried out in the sixth year from the year of main felling. The following operations shall be carried out.

- i) Climber cutting.
- ii) All dead, badly damaged and uprooted trees will be cut.
- iii) All Coppice shoots will be cut

SECTION-2.17: OTHER REGULATIONS:

2.17.1 PROTECTION:

The success of regeneration will depend upon the protection of all areas from fire and control on grazing. The vulnerable areas will be protected from illicit cutting.

2.17.2: FIRE PROTECTION:

Special attention is needed to control fire. The main felling coupes will be rigidly fire protected for a period of 5 years from the year of main felling. It is emphasized that the fire is the foremost reason of non-establishment of natural regeneration. Grazing comes next.

2.17.3 CLOSURE FOR GRAZING:

The main felling coupes will be closed for grazing for a period of five years after main felling. The closed coupes will specially be mentioned in the grazing license and the villagers will be made aware of them by regular drum beating in the villages.

2.17.4 TO INCREASE THE CARRYING CAPACITY OF THE FORESTS:

In order to increase the availability of grass in the areas open for grazing, sowing of seeds of superior grasses like *Paonya*, *Sheda*, *Marval* may be done. These areas will remain closed for grazing from July to November, during which the seeding of grasses will be over. The closure will be made only during the first year of sowing. To have success in this work, the villagers will have to be taken into confidence to ensure their cooperation.

CHAPTER– III

WORKING PLAN FOR IMPROVEMENT WORKING CIRCLE

SECTION.3.1. GENERAL CONSTITUTION OF THE WORKING CIRCLE:

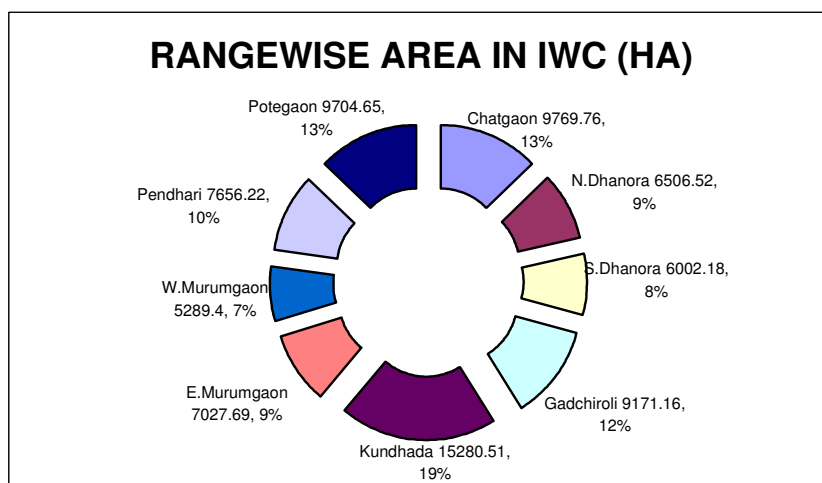
3.1.1. The areas included in this Working Circle comprises part of areas of SCI working circle and Afforestation Working Circle, of the previous plan. The areas are mostly situated either nearby villages or for in the interior places.

3.1.2. Range wise distribution of forest area under Improvement Working Circle is given in the following table.

Table No-62
TABLE SHOWING RANGE WISE AREA (HA) IN IWC

Range	Range area	IWC area	% wrt Range area
Chatgaon	25,360.10	9769.76	38.52%
Dhanora North	22,207.41	6506.52	29.30%
Dhanora South	24,537.42	6002.18	24.46%
Gadchiroli	22,518.61	9171.16	40.73%
Kunghada	24,678.51	15280.51	61.92%
Murumgaon East	22,541.41	7027.69	31.18%
Murumgaon West	21,485.04	5289.40	24.62%
Pendhari	34,879.62	7656.22	21.09%
Potegaon	20,321.15	9704.65	47.76%
Division Total	218,529.27	76108.13	34.83% wrt Division area

DOUGHNUT DIAGRAM REPRESENTING RANGE WISE AREA IN IWC



SECTION- 3.2. GENERAL CHARACTER OF VEGETATION:

3.2.1. The forests allotted to this working circle vary considerably in composition, density and growth. They are inferior in both quality and composition. The area is under stocked near villages due to heavy biotic pressure and areas far away from villages contains sizable patches of well-stocked crop.

3.2.2. The site quality generally varies from III to IV and at places it is II. The density varies from 0.3 to 0.5 and at places it is even below 0.3 and in some areas scrubby growths are also found. The major species found in the crop are *Ain, Dhaoda, Surya, Biba, Semal, Tendu, Garadi, Lendia, Mowai, Khair & Salai* etc. At places bamboo, seen as under growth, is scanty due to heavy grazing and occurrence of frequent fires. Unsound trees are common. Mature and over mature trees are less in composition. Natural regeneration of superior miscellaneous species is not satisfactory but that of other miscellaneous species is adequate. Coarse grasses have come up at some places.

SECTION. 3.3. BLOCKS AND COMPARTMENTS:

3.3.1. The details of compartments and felling series allotted to this working circle has been given in **Appendix no. XXV of volume II.**

SECTION .3.4. SPECIAL OBJECTS OF MANAGEMENT:

3.4.1. The primary object of management is to improve the crop so as to bring the area under SCI Working Circle. The objects of management of this working circle are as follows:

- (i) To improve the stock and bring it under SCIWC as early as possible.
- (ii) To check the soil erosion and conserve soil and moisture.
- (iii) To improve the forests through active peoples' participation wherever possible.

SECTION.3.5. ANALYSIS AND VALUATION OF THE CROP:

3.5.1. STOCK MAPPING:

The entire area under this working circle has been stock mapped by the staff of Working Plan Division No.1 Chandrapur and Gadchiroli Forest Division under supervision of Conservator of Forests, Working Plan-1 Chandrapur. The results of stock mapping have been given in **Appendix no. XLIV of volume II.**

Table No.63

STATEMENT SHOWING THE DISTRIBUTION OF STOCK IN I.W.C.

Site quality	Stock in Ha.
Teak-III	628.98
Teak-IV a	712.09
Teak-IV b	170.69
Plantation	5193.13
Misc-III	18872.45
Misc-IV a	22286.83
Misc-IV b	17899.53
Under stocked	1237.84
Encroachment	10095.34
River bed	14.77

3.5.2.QUALITY AND AGE CLASSES:

The general quality of the crop is IV to III. The crop is mostly young to middle aged.

3.5.3.DENSITY:

The density of the forests allotted to this working circle generally varies from 0.3 to 0.5. At places it is less than 0.3 and above 0.5.

3.5.4. ENUMERATION:

1% enumeration had been conducted by SOFR Unit of CFWP-2, Chandrapur and the result has been compiled in Appendix **no. XVII of volume II.**

SECTION.3.6. SILVICULTURAL SYSTEM:

3.6.1. The silvicultural system prescribed is to improve the growing stock by supplementing the adequate natural regeneration through planting and tending of naturally regenerated crop. In plantations, the species required by local people for their domestic needs, will be preferred. In addition to that to keep the hygiene of the crop, malformed, dead dying and diseased trees irrespective of girth class will be marked for felling and will be removed. Singling operations will also be carried out to facilitate the young regeneration.

SECTION.3.7. HARVESTABLE GIRTH:

3.7.1. No harvestable girth has been prescribed for improvement felling.

SECTION.3.8. CHOICE OF SPECIES:

3.8.1. The choice of species will be as per site-specific requirement. However, Teak shall be the principal species if the soil is deep, fertile and well drained. The

other major species shall be preferably *Bija, Ain, Tiwas, Haldu, Khair, Aola, Moha, Hirda, Behada, Garari, Lendia, Dhaoda, Rohan, Bhirra* and *Kalamb*. In the under storey bamboo will be preferred. Edible fruits and flower yielding trees, in general, are to be reserved everywhere. These are of great importance for the local people. Some shade bearing trees like, *Ficus, Mango* etc, will also be planted for the benefit of wildlife. In no case exotic species will be introduced.

SECTION.3.9. FELLING CYCLE:

3.9.1. The felling cycle of 20 years has been fixed.

SECTION.3.10. FORMATION OF FELLING SERIES AND COUPES:

3.10.1. The total area allotted to this working circle is 76108.13 ha. The entire area has been divided into 36 felling series and each into 20 annual coupes. The sequence of coupes for working will be given in **Appendix no. XXVI of Volume II.**

SECTION.3.11. REGULATION OF YIELD:

3.11.1. As no harvestable girth has been fixed, no yield regulation has been prescribed. Only dead, dying, diseased, malformed trees are to be removed and if necessary, thinning will be done in advanced growth.

SECTION.3.12. AGENCY FOR HARVESTING:

3.12.1. The demarcation and marking will be done departmentally. Felling and disposal will also be done departmentally. All other silvicultural works such as cleaning, thinning, soil and moisture conservation works, planting operation; weeding and fire protection works will be carried either departmentally or through J.F.M. Committees.

SECTION.3.13. DEMARCATION OF COUPE, PREPARATION OF TREATMENT MAP AND MARKING RULES:

3.13.1. DEMARCATION:

Except 1st coupe the subsequent coupes will be demarcated one year in advance of main felling. In the 1st year of working plan, 1st and 2nd coupes will be demarcated and marked. But only 1st coupe will be felled in the 1st year of operation of the plan.

3.13.2. PREPARATION OF TREATMENT MAP:

Soon after the demarcation of main feeling coupes, a treatment map will be prepared by the RFO after thorough inspection of the area and will be verified by the ACF. The DY. C.F. should also do a few sample checks and if he satisfied then only the next step should be taken. The treatment map will show the following areas distinctly:

3.13.3. TYPE A: PROTECTED AREA: This will include

- (i) Areas having slope above 30 degree.
- (ii) Buffer area of 20 meter wide on both the sides of watercourse.

3.13.4. TYPE B: UNDERSTOCKED AREA:

It will include areas with density below 0.4.

3.13.5. TYPE C:

It includes areas of successful old plantations and group of young poles. Thinning will be carried in old plantations as per the prescriptions given in Selection-cum-Improvement Working Circle.

3.13.6. TYPE D: WELL-STOCKED AREA:

This will include all areas above 0.4 density.

3.13.7. To facilitate the preparation of treatment map each coupe in general will be divided into 4 sections. Each type of area will be marked only if its extent at one place is more than 5 ha. The treatment map will be submitted to the DY. C.F. Gadchiroli. The DY. C.F. will get it checked through ACF and after careful scrutiny; the same will be approved by the competent authority and will be sent to RFO for compliance. No area will be treated as unworkable as some kind of work will be required in each type of the area mentioned above.

3.13.8. MARKING RULES:

Demarcation and Marking will be done in the same year. Soon after the receipt of approved treatment map, marking will be done. The marking technique has been described in detail in the Chapter XIV under "Other Important Regulations". The marking rules of each type of area will be as follows:

TYPE A: PROTECTED AREA: No marking will be done.

TYPE B: UNDERSTOCKED AREA:

All edible fruit and flower yielding trees will be reserved from felling. The following trees will be marked for felling:

- (i) All dead and malformed trees.
- (ii) All but one vigorously growing coppice shoot per stool will be retained and the remaining coppice will be marked for felling.
- (iii) All live high stumps.

TYPE C: SUCCESSFUL OLD PLANTATIONS AND GROUPS OF YOUNG POLES:

Thinning will be done in the young pole crops to create gap between trees to 1/3 of the average height of the crop. *Teak* plantation areas will be treated as per prescriptions provided in the "Selection-cum-Improvement working circle" of this plan.

TYPE D: WELL-STOCKED AREA:

All edible fruit and flower yielding trees such as *Moha*, *Achar*, *Tendu*, *Aonla*, *Chinch*, *Bel*, *Sitafal*, and trees of *Kulu* will be reserved from felling. The following trees will be marked for felling.

- (i) All dead and malformed tree means a tree malformed when it is defective or abnormal either in crown or bole, which include conditions like, slag headedness, crookedness, gnaris, twist or constrictions by climbers beyond recoupement etc.
- (ii) All live & dead high stumps
- (iii) All but one vigorously growing coppice shoot per stool where the stem density is less.

3.13.9. Bamboo working will be done as per the sequence of Bamboo Coupes in "Bamboo Overlapping Working Circle" and rules there under.

SECTION.3.14. SOIL AND MOISTURE CONSERVATION WORKS:

3.14.1. Soon after the receipt of approved treatment map, soil and moisture conservation works will also be taken along with marking and will be completed before the onset of monsoon in the next year. Soil and Moisture Conservation works will be sanctioned by the competent authority.

SECTION.3.15. METHODS OF REGENERATION:

3.15.1. After the monsoon is over a treatment map will be prepared showing the following areas:

- (i) Areas with adequate natural regeneration and
- (ii) Areas without adequate natural regeneration.

Regeneration is considered as adequate if number seedling per ha is more than 625. The treatment to the above areas will be given as follows:

3.15.2. AREAS WITH ADEQUATE NATURAL REGENERATION:

In the year following the year of main felling, the naturally regenerated seedlings will be spaced out uniformly by removing all under growth so that the

number of seedlings per ha is as required by the normal stand table for a given site and composition of the crop. The miscellaneous species to be favored in order of priorities are *Shisham*, *Bija*, *Haldu*, *Ain Kalamb*, *Tiwas*, *Dhaoda*, *Bhirra*, *Rohan*, *Garari* and *Lendia*. These seedlings will be treated on par with the planted seedlings. Three weedings and soil working will also be carried out around all the seedlings. Tending, singling and cleaning operations will be done.

3.15.3. AREAS WITH INADEQUATE NATURAL REGENERATION:

In such areas artificial regeneration will be taken in the year following the year of main felling. The pre-monsoon works will be taken in the year of main felling.

3.15.4. BAMBOO PLANTING:

In the current coupes, bamboo under-planting will be done in all suitable sites, except in areas where the bamboo already exists. The details of planting technique are given in the chapter "Other Important Regulations".

SECTION.3.16. SUBSIDIARY SILVICULTURAL OPERATIONS:

3.16.1. The following works will be carried out in the year following the year of main felling and in the subsequent years.

3.16.2. CUTTING BACK OPERATIONS: (CBO):

These will be carried out in the year following the year of main felling and will include:

- (i) Felling of standing trees marked for felling but not felled.
- (ii) All damaged trees during felling, which are not likely to recover.
- (iii) Climbers, which are not of medicinal utility, will be cut.
- (iv) Cutting of all coppice shoots where natural regeneration is adequate.
- (v) Cutting of malformed regeneration of gbh more than 15 cm.

3.16.3. CLEANING:

In the sixth year from the year of main felling, the following operations will be done:

- (i) Climber cutting.
- (ii) Singling of coppice shoots by retaining one or two per stool.
- (iii) Removal of undergrowth interfering or likely to interfere with the growth of teak and other important species.

3.16.4. THINNING:

In advanced growth, marking will be done as per the thumb rule that the spacing should be $1/3^{\text{rd}}$ of the average height of the stand. The average height of the stand will be ascertained by taking height of at least 50 trees. This will include the following operations:

- (i) Climber cutting.
- (ii) Removal of dead, badly damaged trees or trees uprooted by wind or storm.
- (iii) Removal of inferior growth, interfering or likely to interfere with the growth of valuable species.
- (iv) Fruit trees will not be touched during marking, except if they are congested themselves.

3.16.5. The sequences of CBO, cleaning and thinning operations have been given in **Appendix no. XXVII of volume II.**

SECTION.3.17. OTHER REGULATIONS:

3.17.1. PROTECTION:

The main felling coupes will be protected from fire for a period of 5 years from the year of main felling.

3.17.2.CLOSURE FOR GRAZING:

The main felling coupes will be strictly closed for grazing for a period of 5 years from the year of main felling so as to allow the young regeneration to establish. In order to increase the availability of grasses in these areas, seed sowing of superior grasses like Paonia, Sheda, Marvel may be done in suitable patches after soil working.

3.17.3. PARTICIPATION OF LOCAL PEOPLE:

The local people will be made aware of the importance of protection to these forests from fire, grazing, illicit cutting and encroachment. Participation of local people will be encouraged through Joint Forest Management as far as possible. For this purpose, regular awareness campaigns will be arranged and explain the importance and benefit of regeneration and protection of forests. Village Forest Protection Committees will be formed and a comprehensive forest protection scheme will be undertaken under JFM.

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CHAPTER – IV

WORKING PLAN FOR AFFORESTATION WORKING CIRCLE

SECTION-1: GENERAL CONSTITUTION OF THE WORKING CIRCLE:

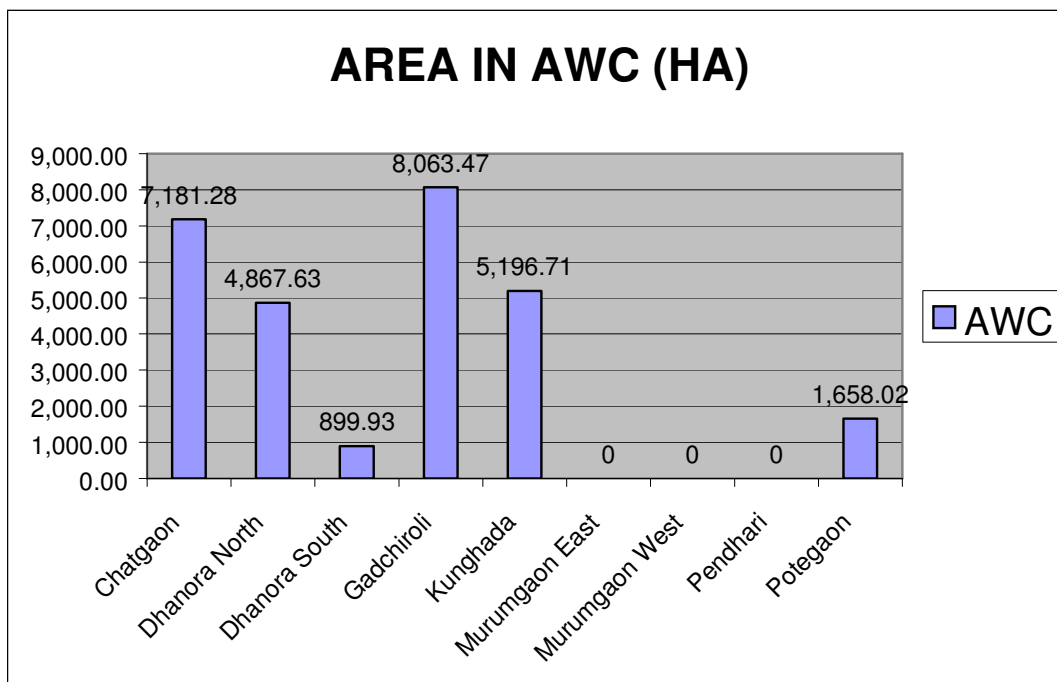
4.1.1. The areas included in this Working Circle comprises of part areas covered under Afforestation Working Circle, and SCI Working Circle of the previous plan with density less than 0.4. Most of the areas under this Working Circle are devoid of vegetation and are subjected to severe erosion. These areas also include the areas of miscellaneous plantations, which are failure due to heavy biotic pressure.

The total area allotted to this Working Circle, is 27867.04 Ha. and are distributed in six ranges viz. Kunghada, Potegaon, Gadchiroli, Chatgaon, North Dhanora and South Dhanora of Gadchiroli Division. Rangewise distribution of area has been given in the following Table.

Table No.-64

TABLE SHOWING RANGE-WISE AREA (in ha) DISTRIBUTION IN AWC

SrNo	Range	TOTAL	AWC	% wrt Range area
1	Chatgaon	25,360.10	7,181.28	28.32%
2	Dhanora North	22,207.41	4,867.63	21.92%
3	Dhanora South	24,537.42	899.93	3.67%
4	Gadchiroli	22,518.61	8,063.47	35.81%
5	Kunghada	24,678.51	5,196.71	21.05%
6	Murumgaon East	22,541.41	0.00	0.0%
7	Murumgaon West	21,485.04	0.00	0.0%
8	Pendhari	34,879.62	0.00	0.0%
9	Potegaon	20,321.15	1,658.02	8.16%
10	Division Total	218,529.27	27,867.04	
	% wrt Total Division area	100.0	12.75	



SECTION- 4.2: GENERAL CHARACTER OF THE VEGETATION:

4.2.1. The area included in this working circle is mostly degraded due to severe biotic pressure. The vegetation is mostly bushy and shrubs like *Dikamali*, *Jilbili*, *Kuda*, *Kharata*, *Bharati*, *Kharasli* and *Lokhandi* are predominant. The areas are poor in site quality with density less than 0.4. Due to heavy pressure of grazing many patches have become almost blank. Main tree species are *Ain*, *Dhaoda*, *Dhoban*, *Bhirra*, *Aanjanwak*, *Lendia*, *Garadi*, *Moha*, *Khair*, *Palas* etc. Natural regeneration is sparse or sometimes absent.

SECTION- 4.3: SPECIAL OBJECTS OF MANAGEMENT:

4.3.1. Special objects of management for these areas will be as follows:

- (i) To reclaim the area by intensive soil and moisture conservation works and afforestation works to enhance the productivity of area through artificial regeneration containing mainly the indigenous species of small timber, fire wood, fodder to meet the demand of local people.
- (ii) To involve local people in afforestation works under the scheme of people's participation in forest management.
- (iii) Maintaining the biological diversity of forests by introducing mixture of species and not the monoculture.

SECTION- 4.4: BLOCKS AND COMPARTMENTS:

4.4.1. No separate block has been segregated for it. Compartment wise area and felling series allotted to this Working Circle has been given in **Appendix no. XXVIII of volume II.**

SECTION-4.5: ANALYSIS AND VALUATION OF THE CROP:

4.5.1. STOCK MAPS:

The Stock Maps have been updated with the help of field staff and under supervision of C F W P Chandrapur-1. Data has been given in **Appendix no. XLIV of volume II.**

Table No.65

STATEMENT SHOWING THE DISTRIBUTION OF STOCK IN A.W.C.

Site quality	Stock
Teak-III	238.55
Teak-IV a	191.17
Teak-IV b	109.26
Plantation	4037.35
Misc-III	1318.79
Misc-IV a	4109.74
Misc-IV b	10628.85
Under stocked	1715.01
Encroachment	5198.14
River bed	0

4.5.2. DENSITY:

The crown density of the tract is less than 0.4. At places it is even more than 0.4.

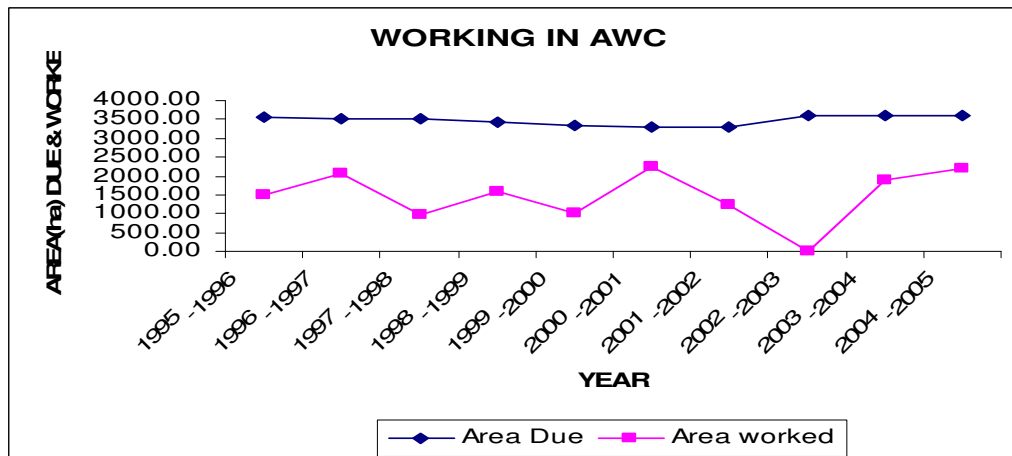
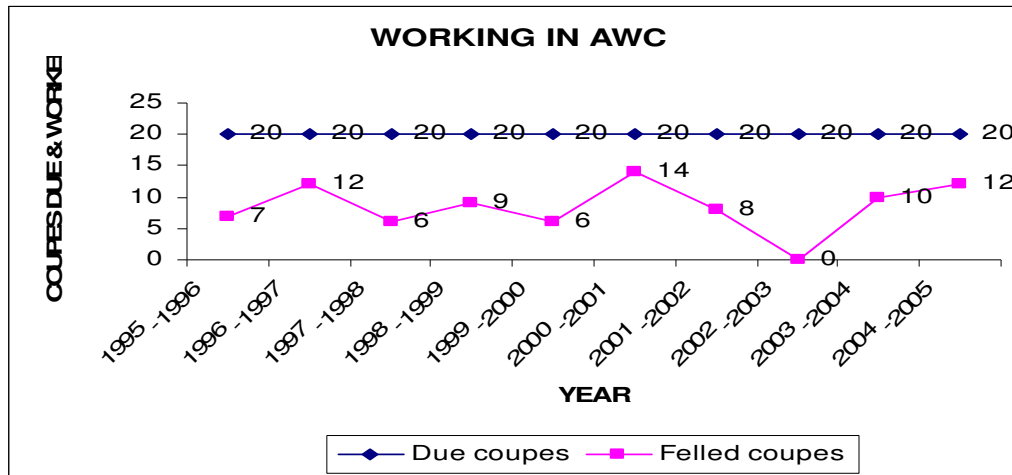
4.5.3. ENUMERATION:

Enumeration of the growing stock has been conducted by SOFR Unit Chandrapur under supervision of CF WP Chandrapur-1.

The following table shows the work done during previous plan period.

Table No.66

AWC				
Year	Due coupes	Felled coupes	Area (ha) Due	Area (ha) Worked
1995-1996	20	7	3572.60	1473.04
1996-1997	20	12	3502.33	2055.25
1997-1998	20	6	3531.97	988.04
1998-1999	20	9	3445.98	1569.76
1999-2000	20	6	3359.58	1008.28
2000-2001	20	14	3275.85	2262.86
2001-2002	20	8	3280.76	1218.36
2002-2003	20	0	3585.80	0.00
2003-2004	20	10	3586.82	1890.98
2004-2005	20	12	3591.06	2203.55
Total	200	84	34732.75	14670.12
Worked		42%		42.2%



SECTION: 4.6. SILVICULTURAL SYSTEM:

4.6.1. As the objective of the management is to enhance the productivity of the area and to meet the requirement of small timber, fuel wood and fodder for the local people. Intensive soil and moisture conservation measures are to be carried out followed by afforestation with suitable species in consultation with the local people. No regular Silviculture will be followed.

SECTION: 4.7. CHOICE OF SPECIES:

4.7.1. Site-specific indigenous species will be selected in consultation with the local people under Joint Forest Management or the Deputy Conservator of Forest will decide the species. In no case exotic species will be tried or introduced. Fruit and flower yielding species such as *Aonla*, *Charoli*, *Sitaphal*, *Moha*, *Biba*, *Bel*, *Hirida*, *Beheda*, will be planted. Among other species like *Neem*, *Siras*, *Shivan*, *Karanj*, *Khair*, *Semal* and *Bamboo* will be preferred. However the selection of species in general will be left to the discretion of the Deputy Conservator of Forest as per the site requirement to get successful plantation.

SECTION: 4.8. FORMATION OF PLANTATION SERIES AND COUPES:

4.8.1. Total area allotted to this working circle is 27867.04 Ha. which is divided into 14 Felling Series. Each felling series consists of 20 coupes. Details of the felling series and coupes and sequence of working have been given in **Appendix no. XXIX of Volume II.**

SECTION: 4.9. YIELD REGULATION:

4.9.1. No appreciable yield is expected from these coupes as most of the area is degraded. Hence no yield regulation has been prescribed. However, the small timber and firewood removed during the working may be distributed among the members of Forest Protection Committee who will be involved in afforestation works. The coupes have been laid out in such a way that approximately equal area will be available for afforestation annually.

SECTION: 4.10. AGENCY FOR WORKING:

4.10.1. All silvicultural operations including plantation and fire protection works will be carried out departmentally. JFM committees will be involved wherever necessary.

SECTION: 4.11. DEMARCATION OF COUPES, PREPARATION OF TREATMENT MAP AND MARKING RULES:

4.11.1. DEMARCATION:

Except for 1st coupe, the subsequent working coupes will be demarcated one year in advance of working. The 1st due coupe will be demarcated, marked and worked in 1st year itself to maintain the continuity of working in the plan period.

4.11.2. PREPARATION OF TREATMENT MAP:

Soon after Demarcation of the main working coupe, a treatment map will be prepared by the RFO and will be verified by ACF I/c of the area after thorough inspection. The treatment map will show the following types of areas distinctly.

(i) **TYPE A: PROTECTION AREA:** It will include areas as follows:

Areas having slope above 25°.

Buffer area of 20 meter wide on both side of watercourse.

(ii) **TYPE B: UNDERSTOCKED AREA:**

All areas with crown density up to 0.4 including blank area.

(iii) **TYPE C: POLE CROP:**

It will include areas of old plantation and group of young poles.

(iv) **TYPE D: WELL-STOCKED AREA:**

It will include areas with crown density more than 0.4.

4.11.3. To facilitate the preparation of treatment map each coupe will be divided into four sections. Each type of area will be marked only if its extent at one place is more than 2 ha. Treatment map will be submitted by RFO to Dy. C.F. through ACF. After scrutiny, the same will be approved by Dy. C.F. and will be sent to RFO for implementation. No area will be treated as unworkable.

4.11.4. MARKING RULES:

Marking techniques have been given in detail in chapter XIV under "Other Important Regulations". Marking rules for each type of area besides climber cutting and tending of naturally regenerated seedlings will be as follows:

TYPE A: PROTECTION AREA: No tree will be marked for felling.

TYPE B: UNDERSTOCKED AREA:

(a) All dead trees will be marked for felling after retaining two dead trees per ha for the purposes of wildlife. The retention of 2 dead trees will be from inferior species as far as possible. (b) All live high stumps will be marked for felling. (c) All marking will be verified by RFO before commencement of works.

TYPE C: POLE CROP:

In this area thinning marking will be done as described in SCIWC.

TYPE D: WELL-STOCKED AREA:

In this area, edible fruits and flower yielding trees will be reserved from felling. The dead trees will be marked for felling, after retaining two trees per

ha for wildlife purpose. If the trees are available for marking, the marking will be done from higher girth class as per procedure and rules described in SCI WC.

SECTION: 4.12. SOIL AND MOISTURE CONSERVATION

4.12.1. Soil and moisture conservation works will be taken all over the area along with the marking and will be completed before the onset of monsoon in the next year.

SECTION: 4.13. REGENERATION

4.13.1. The artificial regeneration will be mainly carried out as major part of areas are under stocked and degraded. However, natural regeneration through coppice and seedlings will be treated as supplementary to artificial regeneration and will be properly tended.

4.13.2. COPPICING:

After felling is over, the stools will be dressed at 10 - 15 cm height above the ground level with a sharp axe.

4.13.3. ARTIFICIAL REGENERATION:

Soon after the approval of treatment map for marking a detailed treatment map for planting will be prepared by the RFO under guidance of ACF. This will show the following type of areas:

TYPE A and C: Areas suitable for bamboo plantation.

TYPE B: UNDERSTOCKED AREA:

Areas suitable for various types of plantations as per soil depths.

TYPE D: Areas suitable for Bamboo planting and gap planting of teak and other miscellaneous species according to the soil depths. The minimum area for gap planting will be 2 ha at a place.

4.13.4. The treatment map will be completed along with marking. After preparation of treatment map, the availability of area for various types of plantations including fodder and grass will be discussed with local people or JFM committees and the species to be planted in various types of areas will be finalized. Bamboo planting will be done in suitable areas in 4th year of planting.

SECTION: 4.14. PLANTING TECHNIQUES:

4.14.1. BAMBOO PLANTING:

Bamboo plantation in suitable areas will be done at a spacing of 6m x 6m in pits of size 45cm x 45cm x 45cm.

4.14.2. PLANTING OF TEAK AND MISCELLANEOUS SPECIES:

The planting will be done in the next year of main felling. Spacing for teak and miscellaneous species will be at 2m x 2m interval. Teak planting will be as per standard technique. Miscellaneous species will be planted in pits of size 30cm x 30cm x 30cm.

4.14.3. PLANTING OF GRASSES:

Planting of grasses will be done in the year of plantation itself either through seed sowing or through tussocks planting. *Sabai* and *Khus* grasses can be introduced. The details of planting techniques have been given Chapter of "Other Important Regulations".

4.14.4. Seed sowing of suitable species will be done over the mound of TCM or CCT.

SECTION: 4. 15. SUBSIDIARY SILVICULTURAL OPERATIONS.

4.15.1. These works will be carried out in the subsequent years of main felling. These works will be carried out departmentally as below.

4.15.2. CUTTING BACK OPERATION (CBO):

CBO will be carried out in the next year of main felling. These operations are listed below.

- (i) All standing trees marked for felling but not felled will be felled.
- (ii) All trees damaged during main felling, which are not likely to recover, will be cut back.
- (iii) All climbers interfering with the growth of regeneration will be removed.

4.15.3. CLEANING:

Cleaning operations will be carried out in the sixth year from the year of main felling. The following operations shall be carried out.

- (i) Climbers will be cut all over the area.
- (ii) Inferior species, interfering or likely to interfere with natural growth as well as planted seedlings will be cut.
- (iii) Seedlings or trees damaged by wild animals and illicit cutting will be cut.
- (iv) Singling of coppice allowing one or two vigorously growing shoots.

4.15.4. THINNING:

First thinning will be carried out in 10th year of main felling. It will be mechanical thinning in case of teak plantation. Alternate diagonal stems will be cut. In 15th year another mechanical thinning will be carried out in which another alternate diagonal stems will be cut. After that silvicultural thinning will be done at the interval of 5 years i.e. 20th, 25th, 30th, 35th, 40th, 45th, 50th, 55th and 60th year of plantation. After that crop will be allowed to be merged with natural forest. In case of other than teak species thinning will be carried out in the interval of 10 years i.e. 10th, 20th, 30th, 40th, 50th, 60th and after that stand will be allowed to be merged with natural forests. Thinning will be of silvicultural nature. Sequence of C.B.O. and cleaning for teak and other species has been given in **Appendix no. XXXII of Volume II.**

SECTION: 4.16. OTHER REGULATIONS:

4.16.1. FIRE PROTECTION:

Main-working coupes will be protected from fire for a period of five years from the year of main working. The local Forest Protection Committees will be given responsibility for fire protection and funds available for fire protection will be given to JFM committee.

4.16.2. GRAZING:

The areas will be closed for grazing for a period of five years from the year of planting. Rising of fodder grasses will be undertaken in the fourth year of closure of each coupe and the seeds of fodder grasses will be broadcasted to encourage the ground cover and to meet the local demand for fodder. Cutting of grasses from plantations may be allowed for fodder purpose.

4.16.1.3. CONSTITUTION OF FOREST PROTECTION COMMITTEE UNDER JFM:

The members of Forest Protection Committees / Joint Forest Management committees will be encouraged for effective protection and better management of these forests.

CHAPTER V

WORKING PLAN FOR BAMBOO OVERLAPPING WORKING CIRCLE

SECTION 5.1. GENERAL CONSTITUTION OF THE WORKING CIRCLE:

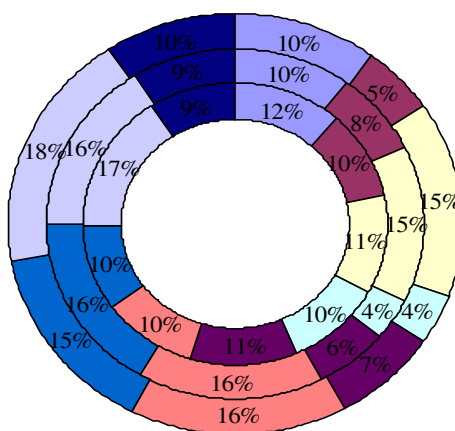
5.1.1. Bamboo Overlapping Working Circle consists of all areas allotted to that working circle in previous plan. It also includes such areas, which were not included in previous plan, but contains considerable quantity of bamboo. Successful bamboo plantations are also included in this working circle.

Table No.-67

TABLE SHOWING THE RANGEWISE DISTRIBUTION OF BAMBOO AREA
(in ha)

Range	Range area	Bamboo Compartment area	Bamboo Workable area	% of Bamboo workable area wrt Range area
Chatgaon	25,360.10	14,699.35	9,139.20	36.03%
Dhanora North	22,207.41	12,367.64	4,911.96	22.12%
Dhanora South	24,537.42	18,640.38	12,525.46	51.04%
Gadchiroli	22,518.61	9,712.79	4,186.25	18.59%
Kunghada	24,678.51	9,841.99	6,437.51	26.08%
Murumgaon East	22,541.41	19,878.14	13,181.97	58.48%
Murumgaon West	21,485.04	20,860.34	12,529.44	58.32%
Pendhari	34,879.62	21,378.28	15,454.62	44.31%
Potegaon	20,321.15	11,480.00	8,129.09	40.00%
TOTAL AREA	218,529.27	1,38,858.91	86,495.50	39.58%

DOUGHNUT CHART OF BOWC



■ Chatgaon	■ Dhanora North	■ Dhanora South	■ Gadchiroli	■ Kunghada
■ Murumgaon East	■ Murumgaon West	■ Pendhari	■ Potegaon	

SECTION 5.2. GENERAL CHARACTER OF THE VEGETATION:

5.2.1. The species of bamboo commonly found in this tract are *Karka* i.e. *Dendrocalamus strictus*. This generally occurs extensively and forms an under storey in better quality forests. They mostly occupy hill slopes and are dense particularly along nalas and moist sheltered slopes. Very few scattered clumps of Katang bamboo i.e. *Bambusa arundinacea* occur on the banks of nalas. Some clumps flower every year. But the extent of flowering is not of gregarious in nature.

SECTION 5.3. LOCAL AND COMMERCIAL DEMAND:

5.3.1. Local people use bamboo for their bonafide requirements. Many attractive articles are made out of bamboo by local artisans, which are in great demand. Bamboo is also used in the construction of temporary walls of hut, cattle shed and compound fencing to protect their agricultural fields from cattle and wild animals. Apart from local demand there is heavy commercial demand from the bamboo based industries.

5.3.2. Local demand of bamboo is very limited as the population density is less and supply is more. After fulfilling the bonafide requirements of locals, the remaining bamboo areas have been given on lease to M/s Ballarpur Industries Limited (BILT) for making Paper Pulp.

SECTION 5.4. BLOCKS AND COMPARTMENTS:

5.4.1. Bamboo areas have been divided into 27 Felling Series out of which 17 is Nistar Bamboo Felling Series (NBFS) and remaining 10 is Commercial Bamboo Felling Series (CBFS). The details of allotment of compartments to cutting / felling series and sequence of cutting has been given in **Appendix no. XXXVII of Volume II.**

SECTION 5.5. SPECIAL OBJECTS OF MANAGEMENT:

5.5.1. Special objects of management of this working circle are as follows:

- (i) To harvest bamboos from all bamboo areas scientifically to get the maximum sustained yield.
- (ii) To meet the Nistar demand of the local population and commercial demand of village industries.
- (iii) To meet the commercial demand of Paper and Pulp industries.
- (iv) To increase the potentiality of the areas of bamboo.

SECTION .5.6. ANALYSIS AND VALUATION OF THE CROP:

5.6.1. STOCK MAPPING:

The bamboo areas in the compartment have separately been stock mapped. Compartment wise bamboo-bearing area has been given in **Appendix no. XXXVIII of Volume II**

5.6.2. ENUMERATION:

Along with sampling of tree species, bamboo inventory has also been prepared. 1% line plot sampling method was adopted. In each sample plot 10% clumps have been enumerated and analysed. The results have been given in **Appendix no. XXXIX of Volume II.**

SECTION .5.7. CUTTING CYCLE:

5.7.1. Harvesting of bamboo will be done on a cutting cycle of 3 years and for this purpose each felling series will be divided into three coupes, viz. A, B and C approximately as equiproductive as possible.

SECTION 5.8: METHODS OF TREATMENT:

5.8.1. The crop will be treated on clump basis, i.e. each clump will be treated independently as per the requirement. Culms of 1st and 2nd year growth should be not cut. Minimum eight mature culms (more than one year old) in each clump will be retained and the remaining culms will be cut.

SECTION .5.9. METHOD OF EXECUTION OF HARVESTING:

5.9.1. DEMARCATION OF COUPE:

Coupes due for working will be demarcated in the months of April-May (before onset of monsoon) in the year in which they become due for harvesting by erecting poles at suitable intervals. On the poles compartment number, coupe and name of the cutting series will be written.

5.9.2. Sample plots will be laid down to estimate the quantity of bamboo available in the coupe after rainy season. The sampling will be carried under supervision of Range Forest Officer and thoroughly verified by Assistant Conservator of Forests in charge.

SECTION -5. 10: IDENTIFICATION OF BAMBOOS:

5.10.1. Since the marking of bamboo is highly selective, it is essential to distinguish current years, previous year's and mature culms from each other.

- (1) **Current year.** Culms sheath is present on lower half of the culms, branches are present throughout the length of the culms and white bloom is present abundantly and comes off easily when touched.
- (2) **Second year.** Culms sheath is absent; branches are present practically at all nodes. White bloom is patchy and comes off easily.
- (3) **Third Year.** Culms sheath absent, branches are present practically at all nodes, white bloom is absent, and it changes in to blackish gray.

SECTION 5.11. METHOD OF WORKING:

5.11.1. Method of working of bamboo is as follows:

- (i) No harvesting works should be permitted between 15th June to 30th September.
- (ii) No culms below the age of two years will be cut.
- (iii) Following culms shall be removed from all clumps.
 - (a) All dead, decayed and dry bamboos.
 - (b) Culms whose half or more top part is broken or damaged.
 - (c) Twisted or malformed culms.
- (iv) In a mature clump the following types of culms (green and living) will be retained.
 - (a) All current season's (i.e. less than one year old) culms.
 - (b) From the rest culms equal in number to the current season culms (i.e. less than one Year old) or eight, which one is more.
- (v) The remaining culms will be considered available for harvesting.
- (vi) The cutting height of culms will be between 15 cm to 45 cm above the ground level i.e. above the first internode above the ground. The cut shall be slant with a sharp instrument.
- (vii) In case of any flowering, no culms from flowered clump shall be felled in the year of flowering.
- (viii) No clump should be considered fit for harvesting unless it contains more than 8 mature culms (one year as well as two years old included).
- (ix) Harvesting of bamboo shall be done in a manner so as to ensure that the retained culms are evenly spaced and that some mature culms i.e. more than two years old are retained on periphery for the purposes of support to the new culms.
- (x) Following Acts will be strictly prohibited.
 - (i) Digging of rhizome.
 - (ii) Lopping of bamboo culms for fodder.
 - (iii) Use of tender bamboo culms for bundling.
 - (iv) Use of bamboo new shoots for consumption.
 - (v) Climbers infesting with growth of bamboo clump shall be cut.

- (xi) After cutting, the debris will be removed away from the clump and will be stacked at a distance not less than 2 m. away from the outer periphery of each clump.
- (xii) In order to facilitate working of congested clumps, wedge shaped opening will be created in the clump from outside to the center of the clump. The width of the wedge will be not more than 75 cms.
- (xiii) Felling will start from the center of the clump towards the periphery.
- (xiv) Clumps, which have been dealt badly by the local villagers, should be cleaned by making use of rule No. (iv) above. Such areas should strictly be closed to grazing for a period of two years. Besides, to improve the condition of such clumps, digging half circular trench to the uphill side of size 60 cm x 60 cm, and 1 to 1.5 meter away from the center of the clumps is proposed to be taken. Besides in the gap, planting of rhizomes during rains should be taken.

SECTION 5.12. AGENCY FOR HARVESTING:

5.12.1. The harvesting will be done as per the Government policy. Some Nistar Fellings areas are being worked departmentally to meet the local demand. The remaining bamboo felling series (CBFS and some NBFS) are being presently harvested by BILT, Ballarshah.

SECTION-5.13: BAMBOO FLOWERING TREATMENT - GREGARIOUSLY FLOWERED AREAS:

5.13.1. Flowering is either periodic or annual. It is either gregarious or sporadic. Gregarious flowering is usually followed by the death of clumps, but in some cases of sporadic flowering, the clumps do not die after flowering. The gregarious flowering proceeds from one end of the forest to another in waves. In 2-3 years the entire clumps of forest flower. The common bamboo (*Dendrocalamus strictus*) found in this area shows an irregular flowering in which one or few culms in one clump or a few clumps in one locality flower at any one time. While at other times all culms of a clump and all clumps in the area are simultaneously flowers. The physiology of bamboo flowering is still not fully understood. There is also a belief that the year of bamboo flowering synchronizes with the year of famine. This is accountable to the fact that drought period hastens up flowering. It is also noticed that in the year previous to flowering year no new shoots are put up. In case of *Dendrocalamus strictus*, it has been observed that intensity of flowering varies from locality to locality and from year to year in the same locality and the span of flowering is to the tune of 40 years cycle.

5.13.2. As soon as the gregarious flowering occurs in any locality its extent should be found out and recorded in the compartment history form and also in the Divisional Note Book. The same should immediately be reported to the Conservator of Forests, Silviculturist and Conservator of Forests, Working Plan No.1. As soon as bamboo starts flowering gregariously the entire area should be closed for grazing and should be strictly fire protected for a period of 8-10 years from the year following the year of flowering. After gregarious flowering all the

bamboo dry simultaneously and dry culms, after seeding, should be cut and disposed as early as possible to avoid fire hazards. After seeding a profuse regeneration of bamboo comes up in the following monsoon. It takes nearly 8 years for new regeneration to reach the harvestable size, but often it takes considerably more time.

5.13.3. *Collection of seeds and disposal:*

The fresh seed of bamboo will be collected from the clumps. Many a time's fallen seeds are attacked by fungus, which destroys the seeds. In order to avoid fungus attack, a mild solution of fungicide may be sprayed over the seeds. The viability of the bamboo seeds is very less i.e. hardly a month or so. Therefore the seeds so collected will either be sent to the Silviculturist for storage or distributed amongst various divisions as per their requirement

5.13.4. *Tending Operations:*

After completion of seeding it is essential to look after the young regenerated crop till clump formation. The following operations should be carried out in the natural regeneration of bamboo.

5.13.5. (A) *CROP AGE BETWEEN 1 TO 3 YEARS:*

During this period the area will normally contained thick seedling crop and the clump formation does not start. For timely formation of clumps the following tending operations will be carried out.

- i) The area should be thoroughly visited and 80 cm. diameter foci at the rate 300 per hectare should be formed and distributed evenly over the whole area.
- ii) All the grasses, weeds and even bamboo seedlings up to a distance of 1.5 meter all around the foci formed as above should be cleared so that the growth of the bamboo seedlings in the selected foci is not hampered.
- iii) All climbers within and around the foci up to 1.5-meter distance should be completely removed.
- iv) The whole area should be strictly protected from fire and grazing.

5.13.6. (B) *CROP AGE BETWEEN 3 TO 8 YEARS:*

During this period clump formation has commenced, but the crop is yet immature for exploitation.

- i) The 300 foci per hectare initially established may be reduced to 150 per hectare well distributed over the whole area retaining only foci containing promising culms.
- ii) All badly grown, twisted and damaged culms should be removed.
- iii) All weeds, grasses and climbers, within and around the foci up to a distance of 1.5 m should be completely removed.
- iv) Tree growth of species other than *Teak*, *Ain*, *Shisham*, *Bija*, *Tiwas*, *Dhaora*, *Haldu*, *Semal*, *Movai* and *Bhirra* over topping or likely to overtop the bamboo clump should be removed.
- v) The whole area should be strictly protected from fire and grazing

5.13.7. (C) CROP AGE ABOVE 8 YEARS:

When the crop age is above 8 years, the clump formation is normally completed and clumps are mature enough for exploitation. The treatment during this period will be of the nature of exploitation-cum-tending. The cutting rules already prescribed in the earlier paragraphs, will be applied here.

5.13.8. CYCLE OF TENDING OPERATIONS:

The operations as prescribed under (A) & (B) above will be carried out annually. When it is not possible due to administrative reasons these operations, except fire protection, will be carried out on alternate years or at the most in a cycle of 3 years. The Conservator of Forests will decide this. The fire protection will be carried out every year and grazing will remain closed till the completion of clump formation.

SECTION .5.14. BAMBOO AREAS OTHER THAN BOWC AREA:

5.14.1. The old bamboo plantations where clump formation has taken place but not included in any felling series, the Deputy Conservator of Forests Gadchiroli (Territorial) will prepare a scheme for the same and get it sanctioned from the competent authority (Not below the rank of Conservator) and inform it to the Working Plan Officer concerned.

5.14.2. INJURIES DUE TO INSECTS AND THEIR CONTROL:

The insects known to attack the bamboo culms are *Estigmina chinensis* (Chrysomelidae colioptera), which attack new culms and make galleries inside the internodes and *Cryptotrachelus longipes*, which is responsible for destroying the growing terminal bud causing branchy growth. The damage caused by insects is not reported so far in this tract. The attack of these insects can be controlled by taking up the following measures.

- i) All the affected culms should be cut and burnt during winter when the insect hibernates,
- ii) Set light ground fire in the infested areas in winter season as insects hide in the debris and
- iii) Biological control through insectivorous birds.

SECTION .5.15 : OTHER REGULATIONS:

5.15.1. FIRE PROTECTION:

Fires cause extensive damage to the new shoots of bamboos and, therefore, these areas must be completely protected from fire by removing all debris from the forest.

5.15.2. GRAZING:

These areas should be protected from grazing especially after flowering and in the rainy season in which the recruitment of new culms takes place.

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CHAPTER-VI

WORKING PLAN FOR FODDER DEVELOPMENT WORKING CIRCLE

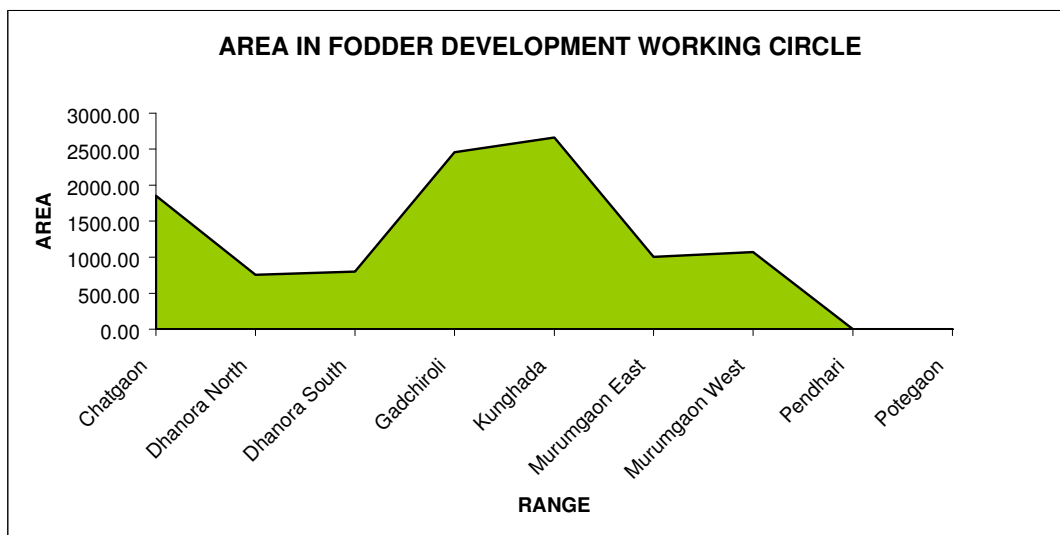
SECTION: 6.1. GENERAL CONSTITUTION OF THE WORKING CIRCLE:

6.1.1. The Fodder Development Working Circle constitutes the areas, which are highly degraded, devoid of vegetation due to biotic pressure, and are situated near the villages. The range wise distribution of the area allotted to this working circle is as follows.

Table -68

TABLE SHOWING RANGEWISE AREA IN FODDER WC

Range	Range area	FODDER WORKING CIRCLE
Chatgaon	25,360.10	1851.28
Dhanora North	22,207.41	752.81
Dhanora South	24,537.42	801.27
Gadchiroli	22,518.61	2341.90
Kunghada	24,678.51	2603.98
Murumgaon East	22,541.41	1004.76
Murumgaon West	21,485.04	1069.96
Pendhari	34,879.62	0.00
Potegaon	20,321.15	0.00
Division Total	218,529.27	10425.96
% wrt dn area	100%	4.77%



SECTION: 6.2. GENERAL CHARACTER OF VEGETATION:

6.2.1. The areas under this working circle are degraded having a density below 0.4 with varying crop composition of miscellaneous species such as *Ain*, *Rohan*, *Dhaoda*, *Khair*, *Lendia*, *Garadi*, *Beheda*, *Moha* with small patches of Teak near the nala banks and rivers. The important shrubs that are generally found are *Bharati*, *Lokhandi*, *Dikamali*, *Dodenia*, *Kharata* etc. Grasses such as Bhurbhusi (*Andropogon pumilus* spp.), Ghonad (*Themada* spp.), Kusal (*Andropogon contortus*), Mushan (*Iseilema laxum*), Paonya (*Sehima sulcatum*) etc. are generally seen. However due to fire during the summer season the natural regeneration is very poor.

SECTION: 6.3. SPECIAL OBJECTS OF MANAGEMENT:

The main objectives are as follows:

- i) To regenerate and rehabilitate the areas around the villages the species, which yield fuel wood, small timber and improved varieties of grasses.
- ii) To improve the area, soil and moisture conservation works can be taken.
- iii) To involve people in forest protection, regeneration and development activities.
- iv) To develop a practice of stall feeding of cattle.

SECTION: 6.4. BLOCKS AND COMPARTMENTS:

6.4.1. No separate blocks have been allotted to this working circle. List of compartments and felling series and extent of area allotted to this working circle has been given in **Appendix no. XXXIII of Volume II.**

SECTION: 6.5. ANALYSIS AND VALUATION OF THE CROP:

6.5.1. 1% enumeration of growing stock has been conducted by SOFR Chandrapur-2. Result of the inventory has been given in **Appendix no. XVII of Volume II.**

SECTION: 6.6. FORMATION OF COUPES AND FELLING CYCLE:

6.6.1. This Working Circle has been divided into 5 felling series. Each felling series will consists of 20 coupes with felling cycle of 20 years.

SECTION: 6.7. METHOD OF TREATMENT:

6.7.1. DEMARCATION OF COUPES:

Except for 1st due coupe the remaining due coupes will be marked one year in advance. 1st due coupe will be marked and worked in the 1st year of

the plan. The area will be demarcated and treatment map will be prepared by R.F.O. and thorough verification will be done by the ACF. The DY.C.F. will also inspect some of the coupes as sample checking. The treatment map will consist of following areas.

(i) **TYPE I: PROTECTION AREA:** It includes:

- (a) Areas having slope more than 25° and above.
- (b) Buffer area of 20 m width on both sides of water body.

(ii) **TYPE II: UNDERSTOCKED AREA:**

It includes following areas: Area with crown density less than 0.4.

(iii) **TYPE III: ADVANCED GROWTH AREA:**

It includes areas with advanced pole crops or plantations.

(iv) **TYPE IV: WELL-STOCKED AREA:**

It includes areas with crown density more than 0.4.

6.7.2. MARKING OF COUPES:

Following types of trees will be marked for felling:

(i) **TYPE I: PROTECTION AREA:** No trees will be marked for felling.

(ii) **TYPE II: UNDERSTOCKED AREA:**

Only dead diseased and dying trees will be marked for felling leaving 2 trees per ha for wildlife purpose. All live stumps will be marked and to be cut to the ground level.

(iii) **TYPE III: ADVANCED GROWTH AREA:**

Natural pole crop will be marked for thinning so as to bring the space to 1/3rd of the average height of the standing crop. Plantation pole crop will be marked for thinning as per the thinning schedule given in Afforestation Working Circle.

(iv) **TYPE IV: WELL STOCKED AREA:**

Only dead, dying and diseased trees will be marked for felling.

6.7.3. PREPARATION OF TREATMENT MAP:

After demarcation of the coupe, treatment map will be prepared by RFO, verified by ACF and after sample inspection by DY.C.F. it will be duly sanctioned by competent authority. Treatment map will include following prescriptions

(i) TYPE I: PROTECTION AREA:

No plantation will be carried out. If necessary, seed dibbling and sowing of local species will be done by Van Majoer/Forest Guard.

(ii) TYPE II: UNDERSTOCKED AREA:

In these areas, if rooted stock is not available, artificial plantation of fodder species of trees or grasses will be taken. The area may be ploughed for sowing of grass seeds. The rooted stock will be cut at ground level and soil mulching will be carried out so that vigour of the stock will be rejuvenated. Fodder and fuel wood tree species will be planted in pits of 30cm x 30cm x 30cm at the spacing of 2m x 2m. Grass seeds of good quality will be sown on raised beds of 40m x 2m x 0.2m at suitable intervals. The area will be strictly closed by Cattle Proof Trenches either by live hedge or TCM. Species will be decided in consultation with local people. Local grass species such as Bhurbhusi (*Andropogon pumilus* spp.), Ghonad (*Themada* spp.), Kusal (*Andropogon contortus*), Mushan (*Iseilema laxum*), Paonya (*Sehima sulcatum*) etc are recommended. But in no case exotic species will be introduced. Agave suckers, Bamboo seedlings are to be planted on TCM at suitable intervals. Nala bunds check dams and brush wood dams shall be constructed on all the gullies and nalas.

(iii) TYPE III: ADVANCED GROWTH AREA:

No plantation will be carried out in this area.

(iv) TYPE IV: WELL-STOCKED AREA:

No plantation will be carried out if adequate natural regeneration is available. (For adequacy of NR 625 per ha is recommended.). If NR is inadequate it will be supplemented with AR. But the extent of such area should not be less than one ha at a place. The sequence of felling and planting schedule has been given in Appendix No.XXXI of volume II.

SECTION:6.8. AGENCY FOR IMPLEMENTATION OF PRESCRIPTION:

6.8.1. All the operations will be executed departmentally. Involvement of JFM Committees will be welcomed.

SECTION: 6.9. SUBSIDIARY OPERATIONS:

6.9.1. Subsidiary operations like cut back operations, tending, cleaning etc will be carried out as per schedule given in Appendix No. XXXV of volume II.

SECTION: 6.10. OTHER OPERATIONS:

6.10.1. FIRE PROTECTION: The area will be strictly protected from fire.

6.10.2. PROTECTION FROM GRAZING:

The area will be strictly protected from grazing. The grass obtained will be cut by the committee members as decided by them. But in no case direct grazing will be allowed.

6.10.3.CONSTITUTION OF FOREST PROTECTION COMMITTEE:

Forest Protection Committees will be constituted and awareness is to be created. All the operations will be executed through JFM Committees under strict supervision and guidance of field staff. The funds allotted for fire protection works, and fencing works should be directly given to committees if they successfully protect the stand. Similarly, work components are also to be entrusted on them to win over the confidence of the people.

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CHAPTER – VII

WORKING PLAN FOR TUSSAR PLANTATION WORKING CIRCLE

SECTION- 7.1: GENERAL CONSTITUTION OF THE WORKING CIRCLE:

7.1.1. This working circle includes the areas on which people have been doing Tussar cultivation traditionally for years together. About 286 families in 26 villages are engaged under this traditional occupation. With norms of 2 ha per family, 572 ha of forest has been earmarked for it. Hence 572 Ha. area has been allotted to this working circle so as to manage the forests for sustainable production of good quality silk-worm cocoons.

7.1.2. Range wise area distribution is given in the following table.

Table No.-69

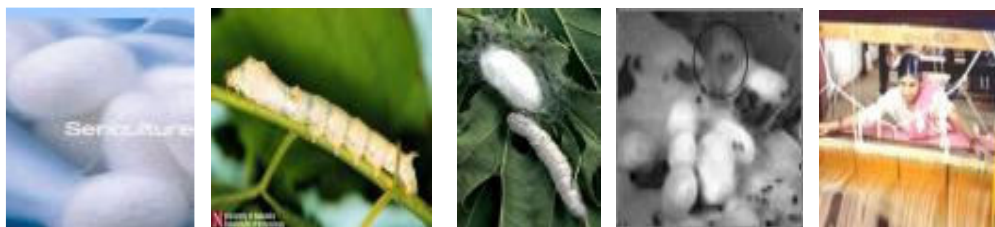
TABLE SHOWING RANGE-WISE AREA IN TUSSAR WORKING CIRCLE (ha)

Sr No	Range	Range area	TUSSAR WC
1	Chatgaon	25,360.10	138.00
2	Dhanora North	22,207.41	16.00
3	Dhanora South	24,537.42	--
4	Gadchiroli	22,518.61	418.00
5	Kunghada	24,678.51	--
6	Murumgaon East	22,541.41	--
7	Murumgaon West	21,485.04	--
8	Pendhari	34,879.62	--
9	Potegaon	20,321.15	--
10	Division Total	218,529.27	572.00
% wrt dn area			0.26%

SECTION –7.2: GENERAL CHARACTER OF THE VEGETATION:

7.2.1. The areas allotted to this working circle are generally situated nearby villages. The trees species on which Tussar raring is carried out is mainly Ain (*Terminalia latifolia*) and Arjun (*Terminalia arjuna*). Some other species are also used very often. Crop is pollarded and is very sparse. The concentration of such areas is more in Gadchiroli, Chatgaon and Dhanora north ranges. Under the guidance of Khadi Gramodyog Department, about 150 ha of Arjun plantation had been taken between 1981-85 in Gadchiroli Range. Planted crop is pollarded regularly and Silk/Tussar worms are reared on it. Silk/Tussar worms are also reared on natural crop of Ain and Arjun. Some people are raring the worms even on their private land.

SECTION-7.3: TUSSAR CULTIVATION AND ITS PRACTICE:



7.3.1. The breeding and rearing of silkworm for the production of silk, is called 'Sericulture'. Sericulture, or silk production is done from the moth, Bombyx mori (L.). Although there are several commercial species of silkworms, Bombyx mori is widely used, as the technique of its rearing is the most improved one. This insect belongs to the family, Bombycidae, and has been domesticated for this purpose.

7.3.2. TUSSER CULTIVATION PRACTICE:

Traditionally the people in the ranges of Gadchiroli, Chatgaon and North Dhanora ranges have been involved in the practice of Tussar silkworm rearing on the natural crop of Ain and Arjun. This practice continued up to 1987 and was stopped due to interpretation that it attracts the provisions of Forest Conservation Act, 1980. However, the Government of India has categorically clarified that the practice of Tussar cultivation does not attract the provisions of the said act. The details of section 1.5 (i), (ii), (iii) of the Forest (Conservation) Act are given hereunder for ready reference.

1.5 Tussar Cultivat ion	(i) Tussar cultivation in forest areas by the tribal as a means of their livelihood without undertaking monoculture of Ain or Arjun plantation shall be treated as a forestry activity. Therefore, no prior approval of the Central Government under this act is necessary.
	(ii) Tussar cultivation in forest areas for which pecific plantations of Ain or Arjun trees are undertaken for providing host trees to the silk cocoons shall be treated as forestry activity and does not require prior approval of Central Government provided, such plantations activity does not involve any felling of existing trees; provided further that while undertaken such plantations, at least 3 species are planted, of which no single species shall cover more than 50% of the planted area.

7.3.4. After clarification from GOI, people are taking silkworm rearing on natural as well as planted Ain and Arjun trees.

7.3.5. Bhoi (Fisherman) community is the main social group engaged in this activity.

7.3.6. NUMBER OF CROP AND DURATION:

Generally three crops in a year are taken. First crop is taken from July to August, second one is from September to October and third one is from November to December. Tussar cultivation needs relative humidity more than 60% for better production. Hence the first crop takes minimum time because of the fact that during July to August the relative humidity is high.

7.3.7. RETURN:

Depending upon the climatic conditions, the return per ha. varies from Rs 5000 to Rs 10,000. The unit of measurement of silk cocoon is Khandi. One Khandi consists of 4,000 cocoons. The rate also varies according to the quality of cocoon. The quality is divided into Quality I, Quality II and Quality III.

SECTOPM –7.4 : BLOCKS AND COMPARTMENTS:

7.4.1 The compartments allotted to this working circle are distributed in Gadchiroli, Chatgaon and North Dhanora ranges. The details of compartments in each range have been given in **Appendix no. XXXVI of Volume II.**

7.4.2. MARKET:

The cocoons are procured by the Kosa Utpadan Sanstha Maryadit, Armori and Kuwakodi. The silkworms are distributed by the same organisation to the beneficiaries. Gadchiroli is one of the centers of silkworm production.

SECTION –7.5: SPECIAL OBJECTS OF MANAGEMENT

Tussar cultivation in these areas is traditionally practiced years together by the local people by pollarding naturally grown trees of *Ain*, *Arjun*, *Bor*, *Sehana*, *Anjan* etc. Due to unscientific way of excessive pollarding and more rotations of silkworm rearing on the same crop resulted in the depletion of crop condition. This resulted in sparse population of these species in the absence of natural regeneration. Hence it is necessary to restore these degraded forest areas through the active involvement of local beneficiary families who are rearing the Tussar silkworm or cocoons. By marketing of the cocoons they are earning substantial monetary benefits. They also use the firewood obtained through pollarded branches and thus destruction of nearby forests for the purpose of fuel wood requirement is minimized.

7.5.1. The special objects of management are:

- (i) To restore the degraded forests through plantations and soil and moisture conservation works.
- (ii) To encourage the people's participation in sustainable management of forests.

- (iii) To uplift the economic conditions of the poor villagers.

SECTION-7.6: METHOD OF TREATMENT & PLANTATING TECHNIQUES:

The survey and demarcation of the areas due for plantation operations annually will be carried out by the RFO and ACF I/c of the area jointly. After joint verification, the treatment map will be prepared as per the site-specific requirement. The following operations will be taken up for the successful plantation of the areas.

- i) Demarcation of the area will be done by providing TCM all around the site. *Agave suckers, Bamboo and Aloevera* shall be planted at suitable intervals through out the length of TCM.
- ii) The cleaning of the areas by removing perennial climbers such as *Kukudranji, Eroni, Kharata* and thorny bushes like *Barati*, will be carried out.
- iii) Soil and moisture conservation works such as nala bunding, check-dams and brushwood dams will be constructed after the completion of rainy season during the preceding year of the plantation.
- iv) Pits of 30 x 30x 30 cms will be dug at spacement of 1.2 x 1.2 mt. during the month of Jan-Feb.
- v) Refilling of the pits will be carried out during the month of May by putting top soil along with 50 gm. DAP or single super phosphate per pit.
- vi) The seedlings of *Arjun, Ain, Anjan, Sehana, Bor, Hirda, Behada, Jamun, Kumbi*, etc. are to be prepared in root trainers at least 6 to 8 months before the plantation works. In case of poly bag seedlings the age of seedling should be 1 to 1½ years old.
- vii) Planting operations will be carried out immediately after the onset of Monsoon when the refilled pits are completely saturated with moisture.
- viii) All the intercultural operations such as weeding, soil working, casualty replacement and fertilizer application will be carried out.
- ix) Fertilizer doses of 25 gm. NPK per plant will be given at the time of 1st and 2nd weeding during 1st year to boost the growth of the seedlings.
- x) Protection measures and fire tracing should be provided at least for 5 years.

SECTION-7.7: CHOICE OF SPECIES:

7.7.1. The list of food plants of Silk/Tussar worms found in this division are as follows:

A. Primary Food Plants		
SrNo	Local Name	<u>Botanical Name</u>
1	Ain/Saja	<u>Terminalia latifolia</u>
2	Arjun	<u>Terminalia arjuna</u>
3	Lendia/Sehna	<u>Lagerstroemia parviflora</u>
4	Bor	<u>Zizyphus mauritiana</u>
5	Anjan	<u>Hardwickia binnata</u>
B. Secondary Food Plants		
1	Hirda/Harra	<u>Terminalia chebula</u>
2	Beheda	<u>Terminalia bellerica</u>
3	Dhaoda	<u>Anogeissus latifolia</u>
4	Jambhul	<u>Syzigium cumini</u>
5	Kumbhi	<u>Careya arborea</u>

From above list at least three species are to be selected which are most suitable for the site. Taking at least three species is obligatory as per the guidelines of the GOI. The spacing should be 1.2m x 1.2m. In the intervening space Sabai grass at close spacing of 45cm x 45cm should be planted.

SECTION- 7.8: TENDING OPERATIONS:

7.8.1. The tending operations to the Tussar plantations should be strictly followed as per the guidance of Central Silk Boards office/Khadi Gramodyog Department. Since the production of cocoons is highly dependant on the relative humidity of the area the trees at 10 x 10 mt. should not be pollarded so as to provide the umbrella type of cover. This will serve the object of providing suitable atmosphere for rearing silkworm as well as retention of trees at desired spacement will improve the canopy of the area.

SECTION –7.9: YIELD REGULATION:

7.9.1. The yield of timber is not the aim but the production of cocoons is the main object. In the long run, seedlings at a spacing of 10 x 10 mt. will give forest cover, which provide better condition for cocoon production. Production of Sabai grass will also boost the income of the people involved in tussar rearing.

7.9.2. PRODUCTION & INCOME:

The production of cocoons varies from 12000 to 15000 per acre which will be further graded in to three qualities. The first quality cocoons fetches Rs, 80 to 100/-, second quality fetches Rs. 60 to 80/-, and third quality will fetch Rs, 40 to

60/- per kg. The average income varies from Rs. 3500 to 5000/- per acre per crop. Thus, each beneficiary family can earn Rs. 14000 to 20000/- per annum.

7.9.3.MARKET:

The main market for the Tussar silk cocoons is the Central Silk Board, which purchases the cocoons through the Co-operative Marketing Societies called Kosa-Utpadan Sahkari Sanstha Maryadit, Armori in Gadchiroli district. These societies also provide free eggs of Tussar silkworms to the beneficiaries on concessional rates subsidized by the Central Silk Board.

SECTION-7.10: OTHER REGULATIONS:

7.10.1 FIRE PROTECTION:

The compartments of this working circle will be effectively protected from fire.

7.10.2. GRAZING CONTROL:

No grazing will be allowed in such forests at all.

7.10.3. PEOPLE'S PARTICIPATION:

J.F.M. Committees should be created in all the villages of tussar plantations and provisions contained in it should be adhered to. The Forest Department should prepare a detailed list of beneficiaries in each village and should be maintained at Range and Division level.

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CHAPTER-VIII

WORKING PLAN FOR NWFP (NON WOOD FOREST PRODUCE) (OVERLAPPING) WORKING CIRCLE

SECTION:8.1: GENERAL CONSTITUTION OF THE WORKING CIRCLE:

8.1.1. This is an overlapping working circle covering the entire forest area of the tract dealt with. The non-wood forest produce includes both the minor forest produce (MFP) and medicinal plants found in this tract. The tract is rich in non-wood forest produces.

SECTION:8.2: NON WOOD FOREST PRODUCES OF THE TRACT:

8.2.1: MINOR FOREST PRODUCE (MFP):

There are numerous minor forests produce available in this tract and are found in almost all ranges with varying extent. These contribute sizeable revenue to the State Exchequer as well as generation of self-employment to local tribals directly or indirectly. MFP plays an important role in rural economy.

The important Non Wood Forest Produce, found in this tract are *Moha Flower, Moha Toli (Moha seed), Bamboo, Tendu Leaves, Myrobalon (Hirda, Beheda, and Aonla), Charoli, Broom Grass, Sabai grass* etc. The compartment wise distribution of a few important species as per tree enumeration data has been given in **Appendix no. XVII of Volume II**.

8.2.2: MEDICINAL PLANTS & ITS NEED:

The tract is rich in variety of medicinal plants, which are used for curing various ailments by the local people and therefore Medicinal plants occupy an important position in day-to-day life of tribals. Their sustainable management and harvesting can generate employment and earn foreign exchange by promoting exports.

Forests are the repositories for about 90% of the medicinal plants, of which 70% occur in tropical forests. Some species have at the verge of extinction in the wild and the number of RED LISTED species is increasing day by day. Hence it is necessary to ensure the in-situ conservation and sustainable availability of medicinal plants by adopting the following measures.

- In-situ conservation of wild population
- Establishment of medicinal nurseries and seed centers.
- Growing of medicinal plants in the degraded forests and other wastelands wherever possible.

In Gadchiroli division under the scheme of medicinal plants preservation and propagation sponsored by F.R.L.H.T. Bangalore, 200 ha. of area

near Gadmauli (Comptt.No.426) in Chatgaon range is demarcated and protected from grazing and other human biotic interference. This area has got 86 different herbs of medicinal importance, which has been given, in the introduction. The list of RED LISTED plants is also given in this volume.

The World Health Organization (WHO) estimated that 80% of the population of developing countries rely on traditional medicines mostly plant drugs for their primary health care. The demand on plant based therapeutics is increasing in both developing and developed countries due to the growing recognition that they are natural products, being non-narcotic, having no side-effects, easily available at affordable prices and some times the only source of health care available to the poor.

At present 90% collection of medicinal plants is from the wild and about 70% of collections involve destructive harvesting hence many plants are endangered or vulnerable or threatened. Currently medicinal plants are collected without having a complete knowledge about their maturity and use. They are also not stored properly, which results in deterioration of their medicinal value.

For sustainable and equitable development of medicinal plants it has been realized that medicinal plants conservation areas are need to be identified, surveyed and studies required are to be conducted in order to take necessary steps for their *in situ* conservation. The task force had also recommended the establishment of “Vanaspati Van” covering an area of about 3500 to 5000 hectares for the intensive production of medicinal plants and their propagation which will produce quality herbal products and generate employment to the local people specially women who are skilled in herbal collection. These “Vanaspati Vans” can be managed under Joint Forest Management Program.

The important medicinal plants available in this tract, has been given in the chapter “Summery of Gadchiroli Division” at page No.XLI.

Dy. Conservator of Forests, Gadchiroli Forest Division, Gadchiroli should maintain a list of the following in the division.

- a) A list of Red Listed plants in the division.
- b) A list of endemic plants of the division.
- c) A list of flora (Published by BSI) of the division, highlighting the flora, most traded medicinal plants, and traditionally used medicinal plants along with their trade name, Marathi name and Local names.

SECTION- 8. 3: SPECIAL OBJECTS OF MANAGEMENT:

As per the National Forest Policy, 1988 the development of non-wood forest produce (NWFP) has been one of the objectives in forest management. Therefore, consistent with the above policy, the special objects of management are as follows.

1. To manage NWFP and medicinal plants scientifically and to utilize the existing potential optimally and thereby to enhance the production of these species.
2. To take measures for conservation and sustainable use of NWFP.
3. To generate employment to the local people and thereby improving their socio-economic conditions.
4. To provide better and improved quality of life and culture to the local tribals.
5. To identify and conserve the forest areas rich in NWFP and medicinal plants.
6. To increase the growing stock of various NWFP species in the area.

SECTION-8.4: METHOD OF TREATMENT:

The treatment to be given will be different for different types of Non-Wood Forest Produce. Therefore each NWFP will have separate treatment as follows:

Table No.-70

TABLE SHOWING MFP PRODUCTION DURING PREVIOUS PLAN PERIOD

Production	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04
Gum	4.21	0.19	146.43	0.55	28.03	42.40	--	--	6.13	122.94
Moha	2798.73	339.25	2952.78	34.04	599.17	1384.00	--	320.78	161.23	132.15
Harra	--	--	847.76	656.50	244.62	398.69	--	6.91	172.18	--
Mohatoli	103.20	--	1664.94	3.94	11.83	26.82	--	--	--	--
Biba	--	--	--	74.28	11.85	--	--	--	--	--
Chinch	--	--	--	6.44	--	--	--	--	--	--
Lac	--	--	0.04	--	--	--	--	--	--	--
Behada	--	--	--	1423.32	3.42	39.18	--	--	--	--
Chinch seed	--	--	--	7.20	--	--	--	--	--	--

8.4.1. MOHA FLOWER & SEED.

8.4.1.1. PARTS USED: Moha flower and Moha seed (known as Moha Toli) are used.

8.4.1.2. SPECIES & ITS DISTRIBUTION:

Moha or Mahua is the tree species. Its botanical name is Madhuca indica. It is widely distributed in this tract. It plays a vital role in tribal's economy and

its nutritional value. Moha flower is rich source of sugar, vitamins and calcium. The flower in its ripe form has almost 73% of all sugars and is, therefore, a better medium than grapes for fermentation.

Moha flowers are eaten raw or cooked. They are also eaten after frying or baking in to cakes. More usually, the corolla tubes, after removing the stamens, are boiled for about 6 hours and left to simmer until water evaporates completely. The odour disappears as a result of cooking and the material becomes soft and jelly like. It is eaten with rice, tamarind, sal seeds, grains or other foods or as sweet meat. Dried Moha flower is also boiled with rice and mixed with wheat flour and this provides a wholesome food. After drying, it becomes valuable food additive to the tribal diet. Moha flowers are largely used in the preparation of liquor locally in the area.

Syrup of good quality is prepared from the corollas by extraction with hot water and clarification with activated charcoal and evaporation under vacuum. The syrup with very high sugar content (61%) has golden yellow colour with the odour of fresh flowers. It is a substitute for honey. Apart from human consumption, Moha flower offers an excellent feed to livestock and wildlife as well. The Moha flowers are good source of crude protein 3.08, digestible nutrients 73.70 and starch equivalent to 55.10/100 kg. The flesh of animals particularly of pigs, fed on Moha flowers acquires delicate flavours.

Besides this, Moha trees have an important place in tribal folklore and religious belief. For example, Moha flowers are used to forecast rain and Moha tree is worshiped. The madias prefer to bury or cremate their dead bodies under a Moha tree.

8.4.1.3. MOHA SEED (MOHA-TOLI):

The Moha seeds are rich in oil, which is thick, and light yellow in colour. Tribals use the oil as edible oil, as a luminance, and also as hair oil. It is also used in the manufacture of detergent soaps. In many areas, it is also used as an adulterant for 'Ghee' for which it is clarified with buttermilk to mask the disagreeable odour. This oil finds place in medicines too.

Crude oil has deep colour, high acidity, unpleasant odour and bitter taste. Refining and hydrogenation yields product similar to mutton tallow or cocoa butter. Oil having acid value below 13 may be refined by treatment with caustic soda and that with higher acid value is extracted with alcohol and further treatment with alkali. Refined oil finds use in the manufacture of lubricating greases and fatty alcohol. This oil is also used for candle, as bathing oil in Jute Industry and as a raw material for the production of stearic acid.

The yield of oil from the seeds depends on the efficiency of the equipments employed for crushing them. It is 20-30% by weight of the kernels when crushed in 'Ghanis', 34-37% in expellers and 40-48% when extracted by solvents.

ISI standards prescribed for Moha oil are as follows:

S.N.	Characteristics	Grade		
		I	II	III
1	Moisture and insoluble impurities % by mass maximum	0.10	0.25	0.50
2	Colour in a ¼ in cell on the Loviband scale expressed as Y + 5R not deeper than	20	30	50
3	Refractive index at 40 degree C.g.	1.459 to 1.460		
4	Sp. Gravity at 90/30 degree C.g.	0.862 to 0.875		
5	Saponification value	187 to 196		
6	Iodine value	58 to 70		
7	Unsaponification matter % by mass	2.0	3	3.0
8	Acid value maximum	0.5	20.0	>20

8.4.1.4 YIELD:

Moha tree starts bearing flowers and fruits between 10th to 15th years of its planting. A study with reference to the yield of Moha flower and fruit has been conducted by the MVSS, Chandrapur in Compartment No.195 in Tadgaon Range of Bhamragarh Forest Division in the year 1992. The trees of different shapes and girth were selected for the purpose of this study.

8.4.1.5 Result obtained are as given in the table given below.

Table No. -71

S.N.	G.B.H. in cm.	Weight in Kg.	
		Flower	Seed
1	076-090	08.00	1.20
2	091-105	10.00	1.00
3	106-120	11.25	2.00
4	136-150	13.30	2.75
5	151-175	13.00	3.80
6	176-190	15.00	4.00
7	206-220	20.00	4.30
	Average	12.94	2.70

In Gadchiroli Forest Division about 175 M.T. of Moha flowers are being collected annually from both tribal and non-tribal areas, out of which 50% of the quantity is consumed locally as food and also for the purpose of brewing domestic liquor.

8.4.1.6 PRESERVATION OF MOHA TREES:

It is mandatory to preserve all the Moha trees and young regeneration irrespective of girth class wherever they occur in the forest as well as outside the forest areas. In forest areas while implementing the working plan activities, the Moha trees and its regeneration should be retained without marking. Wherever possible all the Moha trees shall be provided with soil and moisture conservation works around them to increase the production of flowers and fruits. Traditionally, the people of the area are very conscious about the protection and preservation of Moha trees in their private lands as well as on the public lands. Hence, there is not much of threat to the Moha trees in this tract.

8.4.1.7. PRODUCTION:

Recorded and procured production of Moha flower and Moha toli by TDC has been given in the table above. But due to large-scale consumption at local level and non-procurement of produce by Tribal Development Corporation in time leading to illegal trade.

8.4.1.8. FORMATION OF UNITS AND COUPES:

As the entire tract dealt with comes under Schedule Area in terms of Constitutional provisions and Panchayatiraj Extension to Schedule Area, ownership of minor forest produce lies in Gramsabha. Hence no Unit and Coupe will be formed. Each village will collect and dispose these produce in its jurisdiction. Forest department will keep the record of production.

8.4.1.9. AGENCIES FOR COLLECTION:

Moha flowers and seeds are presently collected by the locals of each village. As the locals collect almost all Moha flowers and seeds around their villages, there is no need to have separate agency for collection.

8.4.1.10. MARKETING:

The collection of Moha flowers and seed was done by the tribals and purchase was done earlier by the Tribal Development Corporation (TDC) a Maharashtra Government Undertaking, which comes under Monopoly Act. Presently, no proper market is available. They sell it to local purchaser. But value added operation is not done. Hence the locals are not getting proper prices for it. With help of Panchayatiraj Institution, Forest Department should facilitate the activities of collection, processing and value addition and marketing the same to enhance the economy of the villagers. The list of minor forest produce purchased by Tribal Development Corporation for past ten years has been given in the Appendix No.LXXVI of Volume II.

8.4.1.11. OTHER REGULATIONS:

- i) No Moha tree will be felled under any silvicultural prescriptions.
- ii) Compartment wise list of Moha trees should be prepared and maintained at beat, round, range and division levels.
- iii) One of the most important reasons of forest fire is the burning of leaf liter under Moha trees by tribals to collect Moha flowers and fruits. Therefore, before the start of flower falling, the ground under the Moha tree crown should be cleaned with joint efforts of villagers and Forest Chowkidars. This may be treated as one of the most important duties of the beat guard.
- iv) The measures for enhancing the production and productivity by local means should be explored.

8.4.2. GUM:

8.4.2.1 USE AND VALUE:

Kulu (*Sterculia urens*), *Dhaoda* (*Anogeissus latifolia*) and *Salai* (*Boswellia serrata*) are the main sources of gum production in this tract. These are used in medicines, chemicals, cosmetics and food industries. *Salai* gum is mostly used as incense and is also used in the Indian medicines for rheumatism and nervous diseases. It has the possibility of becoming an important substitute for imported Canada balsam, used as mounting media in the preparation of microscopic slides. This gum is very similar to turpentine oil. It has also been found suitable in the manufacture of elastic adhesive, lacquers, oilcloth compositions, ink, varnish, paints and perfumery. *Kulu* gum is the costliest gum and is having export potential. *Dhaoda* gum is very good for the preparation of many food articles.

8.4.2.2 YIELD:

The compartment wise estimated distribution of such trees in different girth classes has been given in **Appendix no. XVII of Volume II**. The study of yield of gum has not been done in this tract. The production is low. No scientific method for tapping has been used so far in this area. This field has got potential for employment generation and revenue earning. Besides, the regulations of the collection are very important from protection of forest from fire point of view. Recorded procurement by TDC in the past has been given in the table above.

8.4.2.3. TAPPING RULES:

The rules for tapping of gum, derived by the FRI, Dehradun, are as follows:

- i) The tapping season will commence from November and ends by May of each year. No tree below 90 cm in girth will be tapped.
- ii) Tapping will be confined to the main bole of trees between 15 cm from ground level to the point from which first branch is given off.
- iii) Only trees above 90 cm in girth at breast height will be tapped.

- iv) Each tree will be tapped continuously for 3 years and will be given a rest for 3 years thereafter. The second tapping cycle will begin in the 7th year and will continue for period of another 3 years.
- v) The initial blaze of 20 cm wide and 30 cm in length or height may be made in the month of November on trees at 15 cm above ground level with a sharp edge having 7.5 cm wide blade. The blaze is made 0.6 cm deep in the bark. The blaze may be made horizontally leaving approximately equal space between the two blazes. The blazes should not have any loose fiber. The lower surface of the blaze should be slightly slopping outwards to avoid lodging of guggul in the blazed pocket in case initial blazing is done by adze.
- vi) The guggul starts oozing out soon after blaze are made and may be collected initially after a month, i.e. by December when the blazes may also be freshened. Subsequent collections and freshening may be done fortnightly up to May. Thus 12 freshening may be required to be made during the year.
- vii) In each freshening the lower surface is not to be freshened. The edges may be scraped so that only 3.8 cm is increased on either side in width at the end of 12 freshening. This means that about 0.3 cm should be scraped off either side in width in each freshening.
- viii) The lowest row of blazes will be at one meter above the ground level. The next row of blazes will be made at the height of 60 cm from the lower i.e. at a total height of 1.6 meter from the ground level. The vertical portion of the blaze of upper row will alternate with similar portion of the row and no two blazes of the two rows will be directly one above the other.
- ix) The number of blazes to be made on each tree will depend on its girth at breast height as given in the following table:

Table No.-72
TABLE SHOWING THE NUMBER OF BLAZES ON TREE FOR GUM

Sr.No	Girth at breast height	Max no of blazes to be made on each trees
1	0.9 m to 1.3 m	2
2	1.3 m to 2.0 m	3
3	2.0 m to 3.0 m	4
4	Over 3.0 m	1 Blaze for every 45 cm girth in addition to category 3 above

- x) No fresh blaze will be made on the partially healed up surface or old wounds. Each blaze will be in a shape of parabola with a 2.5 cm wide base. The curved side of the parabola will be upwards and of height

not more than 7.5 cm and the depth of the blaze will not exceed 0.6 cm in the wood.

- xi) At the end of the season, the height of the blaze shall not be greater than 12.5 cm Maximum permissible dimension of each blaze shall be 10 cm x 12.5 cm x 0.6 cm in width, height and depth respectively.

Since the tapping is to be done continuously for three years the total height of the blaze at the end of three years of tapping will be 37.5 cm the width and depth remaining the same. In the second cycle i.e. in the 7th year (after three years rest) new blazes will be made in the same way on the unblazed portion, in between the blazed portions of the first cycle. This blazing will continue for another three years in the manner described above and the operations will be repeated till unblazed portion is fully covered.

8.4.2.4. FORMATION OF UNITS:

Range will be the unit for Minor Forest Produce. For Gum each unit is divided into three coupes, details of which are given in **Appendix no. XL of Volume II**. The working cycle will be of three years.

8.4.2.5. AGENCY:

All operations will be carried out either through member of Joint Forest Management committees or local people under supervision of field staff.

8.4.2.6. MARKET:

As the ownership on MFP is of Gramsabha, marketing will be done by it only. Value added activities need to be taken to enhance the income of the poor people. Export of raw or finished goods should also be thought off.

8.4.2.7. OTHER REGULATIONS:

- (i) The compartment wise list of such trees should be prepared and maintained at beat, round, range and division levels.
- (ii) Cleaning around the trees to facilitate gum collection and to avoid fire, should be done.
- (iii) To improve the stocking of Salai trees, soil around these trees should be dug up in the form of a ring with a radius 1.5 times that of crown. By doing so roots are disturbed and from which profuse shoots come out.
- (iv) Gum producing trees should be reserved from felling.
- (v) Strict watch is necessary to enforce tapping rules.
- (vi) Production of gum should be recorded at village level and maintained upto Division level to assess the actual production.

8.4.2.8. OTHER ACTIVITIES:

Division has to take initiative to enhance the gum production under FDA.

8.4.3. – TENDU :**8.4.3.1. USE:**

It is one of the most important NON WOOD FOREST PRODUCE of the tract which gives handsome revenue to exchequer and opportunity for employment to forest tribals. Tendu Leaves are used for the manufacture of bidis. Presently people are benefited from it by way of getting wages for collection of leaves.

8.4.3.2. YIELD:

The yield of tendu leaves in Gadchiroli division varies from 70000 to 75000 std. bags annually. The unit wise yield is notified every year by the Government through C.C.F. Evaluation and Nationalization. Revenue of Rs 20 to 27 crore is realized annually depending on the disposal of the tendu units. However, year wise production of tendu leaves is calculated in terms of standard bags of each unit and the details of annual yield obtained and revenue realized for the last 13 years has been given in the following table.

Table No.-73

TABLE-SHOWING THE PRODUCTION AND REVENUE

Sr.No.	Year	Total units/ group of units sold	Target in Standard bags	Collection in std. bags	Revenue (Rs.in Lakhs)
1	1993	36	72700	67460	220
2	1994	36	65800	67513	215
3	1995	36	67500	68947	216
4	1996	36	67700	69763	221
5	1997	28	68100	52071	148
6	1998	33	72600	63191	155
7	1999	35	70900	74227	236
8	2000	35	71100	75436	275
9	2001	35	71550	72329	290
10	2002	35	73400	71872	262
11	2003	35	73200	67777	232
12	2004	25	55400	51695	131
13	2005	25	44400	45473	958

No scientific efforts are made to augment the tendu leaves production in this tract so far. On the contrary, every year pruning is carried out officially. The timely pruning operation is considered to be one of the major factors for the production good quality and quantity of the leaves in the area. Tendu leaves are collected both from government forests as well as private lands.

All the tendu trees irrespective of girth shall be preserved and protected. As the tendu leaves are mainly produced from the coppice crop, the young crop is to be protected from all kinds of injuries. No felling and lopping of tendu trees shall be allowed during the process of tendu leaves collection. Root suckers shall be encouraged to improve their growth by carrying out soil and moisture conservation works in the areas where tendu population is more. Heavy penalties should be imposed on the offenders who illicitly cut tendu trees. The extent of illicit cutting of tendu trees and penalty recovered from the offenders in Gadchiroli Division during last thirteen years are given in Appendix No.VIII of volume II.

8.4.3.3. FORMATION OF UNITS:

The tract dealt with has 35 tendu units (group of 49 units). The details are given in the Appendix No.LIII of volume II.

8.4.3.4. AGENCY FOR TENDU LEAVES COLLECTION:

With the enactment of "Maharashtra Forest Produce (Regulation of Trade) Act, 1969" the trade in tendu leaves has been nationalised. Under this Act, tendu units are sold by auction through tenders. Successful tenders are referred as licensee. Prior to 1991, the standard bag system was in practice. But after that the "lumpsum" system has been adopted. In the current system, the notified yield is prescribed for each unit. The leaves puckers are given wages as per the wages decided by the government. In the shadow of Naxalites puckers are demanding more wages than the rates sanctioned by the government. The Government has taken decision during 2006 that profit is not the main object and the royalty received will be given to the puckers in the form of Bonus for betterment of forest dwellers.

8.4.3.5. MARKET OF TENDU LEAVES:

The tendu leaves are used in bidi manufacturing. The Government has imposed ban on the production of Tobacco, the ingredient of bidi, hence the trade is facing downward trend. Moreover the younger generation is also not smoking bidi so the bidi market is gradually coming down.

8.4.3.6. OTHER REGULATIONS:

- i) To improve the tendu stocking, soil around tendu trees should be dug up 15 to 20 cm depth in a circular ring of diameter equal to that of the crown. This will cause injuries to the root suckers to stimulate growth of seedlings through them. The trees of gbh more than 45 cm should be selected for such operation.
- ii) Pruning and lopping should not be done yearly. It should be done at an interval of 3 years during which some seedlings get established and becomes the future tree crop.

- iii) Pruning should be carried out under the direct supervision of the local forest staff. No burning of the area should be allowed. The terms and conditions of the agreement for the collection and disposal of tendu leaves should be given wide publicity highlighting the penal provisions for illicit cutting, burning the areas and opening of illegal collection centers.

8.4.4. BAMBOO:

8.4.4.1. This is one of the important minor forest produce of this tract. This is popularly known as poor man's timber. The local people make use of it in a variety of ways. Tribals use tender shoots and rhizomes as vegetable during monsoon. Besides, it is used by Burads to prepare bamboo articles. Local people use it for construction of huts, houses, cattle sheds and fencing. The bamboo is also used in a number of industries such as Paper and Pulp, Ice cream etc. Details of formation of coupes, and agency for harvesting have been discussed in the chapter "Bamboo (Overlapping) Working Circle".

8.4.4.2. VILLAGE INDUSTRIES:

Making bamboo mat is one of the important and potential propositions. There is a huge demand of the same in this area by many agencies, one of them is WCL. This will increase the economic status of the tribals. The raw material will be supplied by the forest department.

8.4.5. MYRABOLONS, DIKAMALI AND NIRMALI FRUITS:

8.4.5.1. USE:

These minor forest produces are also used in many ways. Hirda, Beheda and Aonla are most common amongst Myrobalons. These are of high medicinal value and are used in many Ayurvedic medicines. Hirda and Beheda are given to child in villages invariably for cold, cough and stomach disorder. Dikamali and Nirmali fruits are used in chemicals and in many other industries. Aola is also used widely for making chavanprash in Ayurvedic Industry. Domestically it is used in making pickles and murraba. Hirda fruits are the major source of tannin, which is widely used in tannin industries.

8.4.5.2. YIELD:

So far no study has been conducted to assess the yield of fruits of such species. The compartment wise distribution of such species in different girth classes have been given in **Appendix no. XVII of Volume II** on the basis of enumeration of forest resources. The Joint Forest Management committee will enumerate the trees of these species and record the yield in the areas assigned to it. All such data will be collected in the division office and updated from time to time.

8.4.5.3. FORMATION OF UNITS AND COUPES:

The range will be the unit. Since working is annual and covers the entire area, the unit will be the coupe.

8.4.5.4. AGENCY FOR HARVESTING:

So far monopoly over collection and disposal of MFP was through TDC. But in the light of Extension of Panchayat Raj to the Schedule areas, these forest produces will be disposed off as per the mode adopted by the Panchayat Raj Institutions. Because the entire tract comes under Schedule areas, Forest Department will facilitate in providing technical guidance about collection of these forest produces.

8.4.5.5. MARKET:

Panchayat Raj Institutions will market the minor forest produces.

8.4.5.6. OTHER REGULATIONS:

- i) The annual out turn of these forest produces should be maintained at range and division levels.
- ii) The detailed list of such species should be prepared and maintained at beat, round, range and division levels.
- iii) These species should be excluded from felling.

8.4.6 - BROOM GRASS:

8.4.6.1. USE:

This grass is used in the preparation of broom, which is usually used in houses. It is a seasonal crop and localized one.

8.4.6.2. YIELD OF BROOM GRASS:

So far no study has been conducted to assess the yield of this grass.

8.4.6.3. FORMATION OF UNIT:

The Range will be the unit.

8.4.6.4. AGENCY:

As decided by the Panchayat Raj Institution under strict silvicultural guidance of forest staffs/officials.

8.4.6.5. OTHER REGULATIONS:

- i) The areas identified for the production of broom grass should be protected from grazing to attain maximum yield per unit.
- ii) The compartment wise details of broom grass occurrence and its production should be prepared and maintained at beat, round, range and division levels.
- iii) These areas should be protected from fires through involvement of local people.

8.4.7. CHAROLI:

Charoli seed is widely used as dry fruit. It is obtained from achar (*Buchnania lanzan*) tree. Though it is widely found in the tract, its recorded production is not available. The scope of this produce is enormous. Seed is annual. Hard kernel is to be de-coated to get the charoli. Non-destructive harvesting is essential as the trend of the young generation is to fell the trees to collect the fruits. It is to be stopped.

8.4.8. SABAI GRASS (*Eulaliopsis binata*) AND IT'S USES:

This is a very good soil binder and comes up well in wastelands. This is good for soil and water conservation. The ropes, which are made from this grass, are widely used in bamboo bundling throughout the state. However, the details of quantity produced are not available.

8.4.8.1. PLANTING PATTERN:

This is planted at a close spacing of 45 cm. x 45 cm. This can be introduced as a inter crop in the Tussar plantations and its uses and economic value shall be told to the people living in the adjacent areas. This can provide substantial income for the local people who are traditionally engaged in tussar cultivation, silkworm rearing and rope making.

8.4.8.2. YIELD AND RETURN:

Sabai grass is not cultivated locally and the quantity available in this tract is not known exactly.

8.4.8.3. FORMATION OF UNIT AND COUPE:

The Range will be the unit in this working circle and unit will be the coupe.

8.4.8.4. AGENCY:

The plantation of Sabai Grass shall be introduced in Tussar plantations and harvested annually to make the ropes through JFM committees. Sabai when made in to ropes fetch good prices. The income thus generated can be deposited in the account of JFM committee for its use as revolving fund. The sharing of the benefits can be as per the standard by laws of the committee.

8.4.8.5. MARKET:

All the nearby cities and town will serve as its market. Besides, this will be used for bundling of bamboos in bamboo working coupes.

8.4.8.6. OTHER REGULATIONS:

- a) The market survey with respect to price and demand of the Sabai rope should be made and record should be maintained at Range and Division levels.
- b) The training for making ropes shall be given under the scheme of FDA.

SECTION-8.5: RESEARCH WORKS:

8.5.1 There are so many NWFPs in the forest, which are unidentified. The efforts of the department should be to explore and manage them scientifically. The identification of medicinal plants is the field to be taken up for study. This has got wide scope in future.

SECTION -8.6: OTHER IMPORTANT REGULATIONS:

The following are the important regulations.

- i) The annual estimates of collection of minor forest produce shall be based on the experience.
- ii) The Range Forest Officer of the respective range will issue the passes to the purchasers of MFP.
- iii) The MFP units should have distinct boundaries.
- iv) Scheme should be formulated for improving the yield of MFP e.g. plantations, protection against diseases etc.
- v) Measures should be taken to maintain and improve the present output of the MFP.

SECTION-8.7: MEDICINAL PLANTS:

8.7.1 ANALYSIS AND VALUATION OF THE MEDICINAL PLANTS:

8.7.1.1 METHODOLOGY FOR STUDYING THE MEDICINAL PLANTS-SURVEY ETC:

In order to assess the potentiality of the areas rich in medicinal plants, field surveys should be conducted by the field staff of Gadchiroli Forest Division by stratified random sampling method. SOFR unit of Chandrapur also conducted enumeration of 0.1% of the entire tract for trees and shrubs. Enumeration of herbaceous plants and grasses should be done during monsoon season as these species occur during this season. It should be done by the territorial division.

8.7.1.2. MANAGEMENT OF THE AREA:

Medicinal plants are mainly herbaceous; tubers, shrubs and some are trees. Hence the management of medicinal plants is the same as that of non-wood forest produces. It is a new concept in forest management. Utilization of

medicinal plants need detailed studies about its occurrence, area, extent, phenology, production and exploitation.

8.7.1.3 METHOD OF TREATMENT:

The involvement of People's Participation in the management of medicinal plants to augment their income should be the basis of management. Division should impart training for treatment of medicinal plants. Help of taxonomists of local science college or university should also be sought for identification of plants. The marketing facilities should be increased so that the confidence of the local people will increase for the sale of their produce. Methodology to be adopted should be as follows:

- i) Selection of suitable non-degraded areas where medicinal plant collections already exist.
- ii) Involvement of a competent local NGO for organizing the community. Collect and document the traditional knowledge about the use of Wild plants by the locals/Tribals.
- iii) Sustainable harvesting of the produce is ensured.
- iv) Specific forest areas may be assigned to local village communities with delegation of responsibilities, privileges and full accountability. The harvest of medicinal plants should be shared under the JFM framework.
- v) Creation of market links for sale of produce may be made available.
- vi) Only parts of a plant whose medicinal values are recognized should be collected e.g. fruits and seeds of neem tree.
- vii) Removal of whole plant or parts of the plants other than the specified ones should be totally prohibited.
- viii) Lopping of branches to collect buds, fruits or leaves should be totally prohibited.
- ix) Fruits and seeds that have fallen on the ground alone will be collected or they are collected without damaging the parts of the tree.
- x) For each medicinal plant/tree species about 1-2 % of the population should be reserved as seed bearers for encouraging natural regeneration and also for seed collection. These trees shall be numbered and marked and no collection shall be done from these seed bearers.
- xi) Tending of coppice shoots/root stocks of existing trees shall be taken up and the natural regeneration shall be encouraged.

- xii) Seeds/seedlings shall be sown/planted in the barren patches and soil worked areas around the tree saplings. The climber medicinal plant species can be planted close to the naturally existing trees and shrubs.
- xiii) If contour trenching is carried out, the species can be raised on the mounds in the first year and in the trenches during the next year when some silt gets deposited in them.
- xiv) At convenient contour intervals, shrubs like *Adhatoda* (*Adhatoda vasica*), Nochi (*Vitex negundo*) and Vettiver (*Vetiveria zizaniodes*) can be raised as vegetative barriers along the contour. These species can also be planted along the RF boundary. This will incidentally facilitate demarcation of the RF from the buffer zone.
- xv) In the swamps, along the stream banks and percolation ponds, hydrophytes like *Neerbrahmi* (*Bacopa monnieri*), *Vallarari* (*Centella asiatica*), *Vasambu* (*Acorus calamus*), *Arathai* (*Alphinia calcarata*) etc can be planted.
- xvi) Maintain a register at every village level regarding the domestic consumption of NWFP family wise.
- xvii) Maintain a register of all the vendors, purchasers, manufacturers, stockiest of NWFP including medicinal plants.
- xviii) A register should be maintained by the purchaser at every collection center having following information, viz. serial number, the full name of the collector, place of collection, name of forest produce, quantity, rate at which Forest produce is sold to vendor/purchaser, name of the purchaser etc.,

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CHAPTER- IX

JOINT FOREST MANAGEMENT (OVERLAPPING) WORKING CIRCLE

SECTION- 9.1: GENERAL CONSTITUTION OF THE WORKING CIRCLE:

9.1.1 Joint Forest Management (Overlapping) Working Circle covers the entire area of Gadchiroli forest division. The area is over burdened with heavy cattle and human population and is subjected to biotic pressure to meet the requirement of fodder, fuel, small timber and timber. Illicit felling and grazing is more common. Cutting of young pole crop for the purpose of firewood and poles and selling the same in the semi-urban areas is common feature by the local poor and unemployed people. Control of these illegal activities and protection of forest and wildlife is becoming a difficult task in the recent past. The staff available for the purpose of protection of forest and wildlife is very meager when compared to the extent of area. Encroachments in forest areas are also a common feature. Due to the presence of Naxal activities, the staff and officers of this division have no control over these activities. Under these circumstances, for the better protection and management of forest resources the joint forest management is one of the best options left with the forest department.

SECTION- 9.2: NEED FOR JOINT FOREST MANAGEMENT:

9.2.1. National Forest Policy 1988 emphasizes the importance of traditional rights of forest dwellers and the importance of their role in protecting the forest. Priority is given to forest dwellers for the use of forest products such as fuel wood, fodder, minor forest produce and small timber to meet their requirements. It also envisages creating a massive people movement with involvement of women in protection, management of forests and minimizing pressure on existing forests.

9.2.2. National Forest Policy, 1988 also mentions that forests should not be looked upon as a source of revenue, but as a national asset to be protected and enhanced for the well being of the people and the nation.

SECTION -9.3: BASIS OF JFM & ROLE OF FOREST DEPARTMENT:

9.3.1. The Government of India vide letter No 621/89-PP dated 1st June, 1990 conveyed to all the State Governments, a framework for creating massive people's movement through involvement of village communities for the protection, regeneration and development of degraded forest lands. Government of India vide Ministry of Environment and Forests, Forest Protection Division Circulars No 22-8/98-FPD dated February 11, 2000 and No22-8/2000-JFM (FPD) dated February 21, 2000 has issued detail guidelines for the Joint Forest Management Programs to be taken up by the State. In continuation to these guidelines the Government of Maharashtra has also issued Resolutions through Revenue and Forest Department vide G.R.No.SLF-1091/C.N.119/F-11 dated 16.03.1992 and G. R. No.

MSC/2000/C.N.143/F-1 dated 25.04.2003 for the effective implementation of JFM program. The Government of Maharashtra has realized that, it is not possible to protect the valuable forests from illicit felling and other illegal activities without active participation and cooperation of local people living in and around the forest areas.

9.3.2. Government of Maharashtra vide Resolution No SLF-1091/PK119/F-11 Mantralaya, Mumbai dated March 16,1992 realizing the fact that illegal felling of forests can not be controlled and checked without the active participation and cooperation of local people. Hence the Government of Maharashtra issued guidelines and instructions for the preparation of plans for the management of forest areas with the active participation and cooperation of local population living in and around the forest areas.

9.3.3. The guidelines and instructions contained in the Government of Maharashtra Resolution dated March 16,1992 encouraged the preparation of Management plans for degraded areas in the State involving the local people from adjoining areas to forests and seeking their participation through JFM.

9.3.4. The selection of areas will be done on the basis of guidelines and instructions contained in Government of Maharashtra Resolution dated March 16, 1992. The Deputy Conservator of Forests, Gadchiroli will take all efforts to motivate the villagers of adjoining forest areas to take participation in the Joint Forest Management. Then he will prepare a micro plan for all such areas to be tackled as per the government instructions issued vide G.R. dated 16.03.1992. The micro plan prepared for the particular village concerned should match with the prescriptions of the working plan. In no case Forest (Conservation) Act, 1980 should be violated while working. The micro plan will be sanctioned by a committee headed by the Conservator of Forests. The areas allotted to Joint Forest Management programs will be under stocked mostly open with crop density less than 0.4. The micro plan of JFM Scheme will be implemented through forest department or any other agency approved by the competent authority. The area allotted should be strictly shown on the map, incorporated in the memorandum of understanding. The micro plan should be prepared with active participation of the people on scientific lines and site-specific estimates should be prepared and sanctioned by the competent authority, before execution.

9.3.5. The Government of India vide its subsequent reference No 22-8/2000-JFM FPD) dated 21/02/2000 issued further instructions to the State Government that at least 50% of the members of the JFM general body should be women, and the presence of 50% of woman member is a pre-requisite for holding general body meeting. Besides that 33% of the Executive Committee members should be women. It has further stated that the JFM activities may be extended even to good areas also. According to the circular, the JFM activity in good forests areas is to confine to NWFP activities only, and under no circumstances, the silvicultural prescriptions should be altered. The sharing mechanism is different from the usual and sharing of profit from timber will be only when the Committee protects the area for at least 10 years and sharing percentage not to exceed 20% of final harvest. The JFM activities in good forests shall not exceed 100 ha area. It further

says that JFM in good forest cover shall be on a pilot basis and should be done, only after the degraded areas have been tackled.

9.3.6. The Forests around the human habitations are degraded and need rehabilitation to increase their productivity.

SECTION- 9.4: AREA OF OPERATION:

9.4.1 Initially the area of operations of JFM was restricted to poor and degraded areas of the forests around villages where heavy biotic pressure is experienced. However, of late it is realized that the area of operation of JFM activities can be extended even to good quality forests also due to the positive impact of JFM in protection of forests.

SECTION- 9.5: SPECIAL OBJECTS OF MANAGEMENT:

9.5.1. The special objects of management have been defined keeping in view of the National Forest Policy 1988. In order to check further loss of forest cover and to regenerate the degraded forest areas the objects of management have been enunciated as follows:

- i) To rehabilitate and regenerate the degraded forest areas through JFM.
- ii) To check soil erosion and water conservation through JFM.
- iii) To maintain an optimum level of carrying capacity in the forests.
- iv) To protect the forests from illicit cutting.
- v) To utilize the degraded forest areas for productive purposes in order to meet the demand for fuel, fodder and timber and ultimately achieving the integrated development of the adjoining villages with the help of other development agencies.

SECTION- 9.6: SOCIO-ECONOMIC CONDITIONS OF THE PEOPLE:

9.6.1. The tract dealt with is the remotest tract of the Maharashtra State. It is located on the southeast part of Maharashtra bordering Bastar district of Chhattisgarh State. On the basis of Socio Economic Survey published by Economic and Statistical Directorate the population pertaining to this tract consist of 38% Scheduled Tribes and 12% Scheduled Castes. Population density is 62 people per square kilometer.

9.6.2. As per 1997 survey the cattle unit present in the tract dealt with is 1,59,000. Whereas the carrying capacity of these forests is about 2,34,000 cattle units. Enough area is available for cattle for grazing. But grazing incidences are localized which result in heavy pressure on certain areas resulting in their degradation. The

migratory cattle have no role to play in the tract. Hence the pressure is certainly very much localized in certain pockets.

9.6.3. It creates imbalance on utilization of forest resources even though which is abundant in this tract. The poverty in the tract is so acute that people need immediate benefit of forest resources after protecting the forest for ten years. Naxalites in the tract are against the JFM activity and forcing the villagers not to form any committee. People's participation in the management of forest may of course eliminate the naxalites activities from the area and forest condition may improve gradually.

9.6.4. People of Lekha Mendha village of Dhanora Tahsils have realized the importance of forests for their life and culture. They started protecting forests under `Our Government Our Jungle` even before the concept of Participatory Forest Management took its present shape. Earlier they were not allowing any forest personnel to enter into their village. Now they have constituted successful Forest Protection Committee under JFM.

SECTION- 9.7: COMPARTMENTS AND FELLING SERIES:

9.7.1. The list of villages, which need to be tackled under JFM has been given in the **Appendix no. LXV of Volume II.**

SECTION- 9.8: ACTIVITIES TO BE TAKEN:

Following activities are to be undertaken:

- a) Effective protection of forests allotted to JFM Committee.
- b) Involvement of local people in regeneration of forests.
- c) Protection of forests from fire, grazing, illicit cutting and encroachment.
- d) Non-destructive collection of minor forest produces and sharing of benefits by its members, as per agreement.
- e) Helping the forest officials in law enforcements and patrolling.
- f) Conducting meetings and helping the Government officials.

9.8.1. Co-ordination of other Departments should be sought and forest department should be the coordinator to such schemes. JFM committees should be assigned fire protection works. The money allotted for fire protection works should be directly remitted to JFM committees after successful protection of the forests from fire. All legal and moral help should be provided to the members protecting the forests from illegal activities. Then only forest conditions will improve.

SECTION-9.9: ROLE OF FOREST OFFICIALS:

9.9.1. Role of forest official in JFM is as under-

- a) The forest officials are supposed to give technical input and support for the activities performing under JFM for ensuring scientific forest management.

- b) They are expected to create awareness amongst the villagers about the role and benefits of forests and need to protect the same.

SECTION-9.10: PRESENT STATUS OF J.F.M. IN GADCHIROLI FOREST DIVISION:

9.10.1. At present in Gadchiroli Forest Division, Forest Protection Committees has been formed in 106 villages and about 48004.79 Ha. area of forest have been assigned for protection and management under provisions of Government Resolution No. SSL/1091/C.N. 119/D-11 dated 16.3.1992. Out of which 30 villages have been brought under Forest Development Agency, Gadchiroli covering forest area of 15653.80 Ha. Sources of funding for FDA villages are from Government of India. Micro-Plans have been prepared and sanctioned by the competent Committee.

9.10.2. There are about 379 villages in or around the forests of Gadchiroli Division and the division will constitute J.F.M. committees in all villages.

SECTION- 9.11: GOVERNMENT'S G.R.s AND ORDERS:

9.11.1. Present Government Resolutions and orders have been given in **Appendix no. XLVI of Volume II.**

SECTION- 9.12: ACTIVE PARTICIPATION OF LOCAL PEOPLE:

9.12.1. The local people should be made aware of the importance of protection of forests from fire, illicit grazing, illicit cutting and encroachment. Participation of local people will be encouraged in protection and afforestation activities. For this purpose, regular efforts like meeting, hoarding, workshops, visit to successful areas etc will be arranged to explain the people about the importance and benefit of regeneration and protection of forests. Village forest protection committees shall be formed and a comprehensive forest protection scheme shall be undertaken. For protection from grazing integrated efforts should be taken to improve the quality of cattle so that the income of people will enhance. The JFM committees should be assigned certain fire lines and forest area for fire protection. The money meant for fire protection should be given to JFM committees after successful protection of the forests from fire.

SECTION-9.13: ROLE OF WOMEN IN JFM:

The Government of India in its G.R. dated 21.02.2000 has stated that at least 50% of the members of the JFM general body should be women, and the presence of 50% women members is a prerequisite for holding general body meeting. Besides this, 33% of executive committee members should be women. These instructions should be strictly followed while implementing the JFM activities.

SECTION-9.14: REGENERATION OF FORESTS IN JFM AREA:

As per the objects of management, the degraded forest areas near the villages are to be brought under sustainable management through regeneration activities to meet the demand of fuel, small timber and fodder. The regeneration operations in such areas should be highly selective and site specific. For successful management of such areas, both the i) natural and ii) artificial regeneration methods can be adopted.

9.14.1. NATURAL REGENERATION:

In areas wherever good rooted stock is available, the aided natural regeneration activity is to be taken up by carrying out the following operations:

- a) Demarcate the whole area by TCM selected for JFM activities.
- b) All the live stumps/pollarded stems will be thoroughly cut back to the ground level and stump dressing is to be done with axe.
- c) Climbers such as Kukud ranji (*Calycopteris floribunda*), Eroni (*Zizyphus oenoplia*), Chilar (*Ceasalpinia ecapetala*), chilati (*Mimosa hamata*), Chilati badi (*Acacia torta*) will be cut to facilitate the growth and development of existing trees.
- d) Carry out singling operations in all the coppices by reserving one leading shoot per stump.
- e) Close the area for grazing and other biotic interference at least for a period of five years.
- f) Provide fire protection of the areas for better regeneration of grasses through natural dispersal of seeds.
- g) Provide complete protection of the area from illicit felling for poles, firewood and grazing
- h) If badly damaged/congested bamboo clumps are available in the selected JFM areas, the same are to be cleaned by removing malformed, twisted and dried bamboo to promote the growth of new culms.

9.14.2. ARTIFICIAL REGENERATION:

The areas selected for JFM are degraded, eroded and poor in rooted stock. In these areas artificial regeneration and soil and moisture conservation activities will be taken to conserve the moisture, and to bring the area under sustainable management to meet the demands of firewood, small timber and

fodder. The following operations are to be taken up for the successful regeneration through artificial plantation with people's participation.

- a) Demarcate the area selected for JFM activities by providing TCM.
- b) The treatment map will be prepared after inspecting the area jointly by RFO/ACF and committee members.
- c) The treatment map shall be self-explanatory with all the details such as soil type, soil depth, gradient, type of erosion, the species of trees/plants, shrubs, and grasses etc. that are growing naturally.
- d) Site-specific estimates are to be prepared showing the requirement of species, and the type of SMC works to be taken up.
- e) In case of good soils 50% of timber species, 25% fruit & flower yielding species of NWFP (as per the choice of committee) and 25% fuel and fodder yielding indigenous species are to be planted.
- f) In open areas, the spacing of 2 x 2 mt. is to be strictly followed to have more survival percentage of trees at the end of completion of the scheme.
- g) The whole area is to be taken care by the committee members from fire and grazing.
- h) All plantations as well as soil and moisture conservation works should be done by the villagers and fund allotted to these works will be given to the committee.

In case of shortage of departmental funds, these operations shall be taken up under the Employment Guarantee Scheme.

9.14.3. SHARING OF BENEFITS:

Sharing of benefits among the members of the JFM committee will be as per the standard instructions given in the guidelines issued by the government. In case of JFM activity in good forest areas the benefit sharing is restricted to NWFP only. Sharing of profit from timber will be only when the JFM committee protects the area for at least 10 years and sharing percentage not to exceed 20% of final harvest.

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CHAPTER –X

WORKING PLAN FOR WILDLIFE MANAGEMENT (OVERLAPPING) WORKING CIRCLE

SECTION –10.1: GENERAL CONSTITUTION OF THE WORKING CIRCLE:

Wildlife Overlapping Working Circle covers the entire area of the Division. The Forests of Gadchiroli Division are not rich in wild fauna. One of the major factors contributing to the depletion of wild fauna in the past was perhaps indiscriminate shooting of wild animal for pleasure and food during the jamindari regime. Hunting by local tribals also contributed in the decline of wildlife even in the interior hilly areas. Besides this, increase in biotic pressure have also led to the severe degradation of natural habitat of wildlife.

SECTION –10.2: SPECIAL OBJECTS OF MANAGEMENT:

The special objects of management are as follows-

- i) To preserve and develop the existing wildlife in the tract.
- ii) To improve the wildlife habitats.
- iii) To develop and maintain the infrastructure facilities such as water holes, anicuts, saltlicks etc.

SECTION-10.3: DESCRIPTION OF HABITAT:

The tract dealt with is an ideal natural habitat for the wildlife. The area is highly undulating and hilly. The forests are of mostly dense miscellaneous type with rich floristic composition. The general condition of wild animals is highly unsatisfactory in this area. However in the interior areas where biotic pressure is less, variety of wild animals are found. The wild animals are also widely distributed near perennial watercourse and stagnant pools during summer.

The wild animals that are generally found in this tract are as follows-

10.3.1. CARNIVORES:

Table No.-74
LIST OF CARNIVORES

S.N.	COMMON NAME	SCIENTIFIC NAME	SCHEDULE/PART
1	Bibta/Panthe/Tendua	<u>Panthera pardus</u>	I/I, (16B)
2	Fox/Lomadi/Lomas	<u>Vulpes bengalensis</u>	II/II (1-B)
3	Jackal/Kolha/Siyar	<u>Canis aureus</u>	II/II (2-B)
4	Jungle cat/Ran Majar	<u>Felis chaus</u>	II/II (2-C)
5	Tadas/Lakadbagha	<u>Hyena hyena</u>	III (12)
6	Wild dog/Ran Kutra/Jungli Kutta	<u>Cuon alpinus</u>	II/I (22)

10.3.2. HERBIVORES:

Table -75
LIST OF HERBIVORES

Sr.No	COMMON NAME	SCIENTIFIC NAME	SCHEDULE/PART
1	Aswal/Bhalu/Riksha/ Bear	<u>Melursus ursinus</u>	I/I, (31C)
2	Bandar/Monkey	<u>Rhesus mulatta</u>	II/I (17A)
3	Bhekar/Barking Deer	<u>Muntiacus muntjak</u>	III (2)
4	Chausingha/Four horned antelope	<u>Tetracerus quadricornis</u>	I/I, (8A)
5	Cheetal/Deer/Hiran	<u>Axis axis</u>	III (5)
6	Common langur/ Hanuman Bandar	<u>Presbytis entellus</u>	II/I (4A)
7	Hare/Shasha	<u>Lepus ruficaudatus</u>	IV (4)
8	Nilgai/Blue Bull	<u>Boselaphus tragocamelus</u>	III(14)
9	Sambhar	<u>Cervus unicolor</u>	III (16)
10	Wild boar/Ran Dukar/Jungali Suar	<u>Sus scrofa</u>	III (19)

10.3.4. RODENTS:

Table-76
LIST OF RODENTS

Sr.No	COMMON NAME	SCIENTIFIC NAME	SCHEDULE/PART
1	Mongoose	<u>Herpestes spp</u>	II/II (16)
2	Porcupine/Shahi	<u>Hystrix indica</u>	IV (4E)
3	Mice		V (5)
4	Rats		V (6)

10.3.5. BIRDS:

Table-77
LIST OF BIRDS

Sr.No	COMMON NAME	SCIENTIFIC NAME	SCHEDULE/PART
1	Painted Sandgrouse	<u>Pterocles indicus</u>	IV 11 (60)
2	Common Sandgrouse	<u>Pterocles exustus</u>	IV 11 (60)
3	Pea Fowl/Mayur/Mor	<u>Pavo cristatus</u>	I/III (11)
4	Grey Jungle Fowl/Jungli Murga	<u>Gallus sonneratii</u>	II/II (17)
5	Painted Partridge	<u>Francolinus pondicerianus</u>	IV 11(51)
6	Black breasted Quail	<u>Coturnix coromandelicus</u>	IV 11(57)
7	Red Spour Fowl	<u>Galloperdix spadicea</u>	IV 11 (36-A)
8	Crane	<u>Grus antigone</u>	IV 11 (16)
9	Spotted Bill Duck	<u>Anas poecillorhyncha</u>	IV 11 (21)
10	Pigeon	<u>Treron phoenicoptera</u>	IV 11 (54)
11	Dove	<u>Streptopelia spp</u>	IV 11(19)
12	Cotton Teal	<u>Nettapus coromandelienus</u>	IV 11 (70)
13	Cuckoo	<u>Cuculus varius</u>	IV 11(170)
14	Snipe	<u>Capella galliachges</u>	IV 11 (62)
15	Vultures	<u>Gyps indicus, Gyps bengalensis</u>	I/III (21)
16	Whistling Teal	<u>Dendrocygna javanica</u>	I/III (7A)
17	Woodpecker	<u>Picidae spp</u>	IV 11 (79)

10.3.6. REPTILES:

Table-78
LIST OF REPTILES

Sr.No	COMMON NAME	SCIENTIFIC NAME	SCHEDULE/PART
1	Crocodile/Magar	<u>Crocodilus porosus</u>	I/II (1D)
2	Chameleon	<u>Chameleo calcarats</u>	II/I (24)
3	Cobra	<u>Naza naza</u>	II/II (11)
4	Karait	<u>Elapidae spp</u>	IV (12)
5	Viper	<u>Vipera ruselli</u>	II/II (14)
6	Dhaman or Rat Snake	<u>Ptyas mucosus</u>	II/II (9)
7	Ghorpad	<u>Varanus griseus</u>	I/II (1)
8	Common Lizards	<u>Varanus spp</u>	II/II (15)
9	Pythons	<u>Genus python</u>	I/II (14A)

Where: Schedule means Schedule of animals as given in Indian Wild Life Protection Act, 1972 and part means part of that schedule, e.g. I/II (12) means schedule I and part II of schedule I at serial number 12.

Besides these species, a large number of other animal species e.g. insects, beetle, moths, scorpions, lizards etc are found in the tract.

SECTION- 10.4: METHODS OF TREATMENT:

No regular schemes are being prescribed for the management of wildlife in this tract. However following prescriptions are being made for the protection of wildlife, increasing infrastructure for wildlife management and aiming to restore the status of wild animals in this tract.

- (i) Potential habitat of wild animals and existing water holes should be identified and will be shown on the treatment map.
- (ii) In the felling coupes at least two dead trees will be retained per ha. and these trees will act as snags and den trees for nesting and resting of the wild animals.
- (iii) In the coupes, fruit yielding trees will be retained and in the plantation fruit trees will be planted which provide food to the animals.
- (iv) The water holes, which are frequently visited by wild animals, will be excluded from grazing by making a special mention of such areas in the grazing permit.
- (v) The existing water holes will be maintained and at suitable sites new water holes will be created to make the water holes distributed evenly throughout the tract as far as possible.
- (vi) Suitable locations will be identified where forest tanks will be constructed to provide water to the wild animals,

- (vii) Hoardings about the importance of wildlife and its protection will be displayed at all the important places.
- (viii) The labour camps and transit depots will be established away from the areas having high density of wild animals.
- (ix) Saltlicks will be developed.
- (x) A vigilant watch will be kept on poachers also at the checking gates erected to check/prevent the illicitly transport of forest produce.
- (xi) Continuous and thorough patrolling of the vulnerable areas and state borders by establishing anti-poaching squads to prevent illegal poaching.
- (xii) Maintain a list of persons possessing weapons/firearms and keep continuous vigilance to prevent illegal poaching both at range and division level.
- (xiii) Maintain a list of habitual poachers and their photographs and display them both at range level and division level and at important public places.
- (xiv) Wildlife habitats should be effectively protected from fire, grazing and other adverse factors.
- (xv) Domestic and wild animal have a common source of contiguous disease. It is very difficult to control the wild animals from such contiguous disease. Hence the cattle should be immunized from disease from time to time. Only such immunized cattle should be allowed to graze in the forests.
- (xvi) The provisions contained in the Wildlife (Protection) Amendment Act, 2003 will be enforced rigidly.
- (xvii) Periodic estimation of fauna (both carnivores and herbivores) is necessary so that its population and distribution can be known.
- (xviii) Multipurpose watch towers will be erected at suitable places to watch wildlife movements, fire and grazing.
- (xix) Awareness camps regarding wildlife and their importance must be organized for public from time to time.

SECTION- 10.5: ABUNDANCE AND STATUS OF WILD ANIMALS IN THE PAST AND PRESENT:

10.5.1. The forests of the tract dealt with are abundant in wildlife to some extent even today. As these forests are mostly inaccessible, the wild animals and birds enjoy natural protection. The tract was part of Aheri Jamindari and shooting of wild animals by the jamindars and their men was so common. In the past, no

proper management on wildlife was followed and no scientific control was enforced in hunting of wild animals. License for game used to be given up to late seventies in the last century. After that no license had been issued.

10.5.2. Wild animals, which need special attention and protection, have been enlisted in six schedules as per The Wild Life (Protection) Act, 1972. Important species of concentration is discussed below:

(1) BISON (*Bos gaurus*): Earlier Bison were found in the entire tract. Bison are mainly migratory from Chhattisgarh area.

(2) TIGER (*Panthera tigris*): Tiger (Sher) was occurring in moderate number. During summer they usually confined to the watercourses. In Kartar Singh working plan for East Chanda Forest Division, tiger had been reported only in Ekara area, which is now in Bramhapuri Forest Division. Thus, tiger was not reported in the tract even during Kartar Singh period. A few migratory ones occasionally used to enter into this tract from Bastar District of Chhattisgarh. Presently, no tiger has been reported during 2005 estimation.

(3) PANTHERS (*Panthera pardus*): They were less common in this tract. They were seen in the vicinity of the villages frequently. Sometimes they used to enter into the villages and cause damage to the cattle and human being.

(4) SAMBAR (*Cervus unicolor*): They are confined in the foothills only. Now-a-days sambars are found in the entire tract but in small number.

(5) CHITAL (*Axis axis*): Chital are found in the entire area. Herd of 25-30 animals are seen almost all forest blocks and near water courses.

(6) BLUE BULL (*Boselaphus tragocamelus*): Blue bull is found in the entire tract. They are commonly seen in the forest near human habitations. They, sometimes, causes damage to agricultural crops.

(7) BARKING DEER (*Muntiacus muntjak*): They are found in the entire tract. They are solitary animal. They are seen in one or two in the tract.

(8) SLOTH BEAR (*Melursus ursinus*): They are found in this tract in good number.

(9) WILD BOAR (*Sus scrofa*): They are very common all over the area. They are found in small herd in the entire tract.

(10) WILD DOG (*Canis alpinus*): They are found in herds and do considerable damage to other wild animals.

10.5.3. COMMON ANIMALS: - The Malabar squirrel (*Scrinus spp*), Flying squirrel, jackal (*Canis aureus*), Hyena (*Hyena hyena*), Porcupine (*Hystrix indica*), are common all over the tract. Langur (*Presbytis entellus*), are found on the fringes of forests.

10.5.4:-BIRDS: Pea fowl (*Pavo cristatus*), Grey jungle fowl (*Gallus sonneratii*) are common. Ducks are commonly found in the rivers. Titar (*Francolinus pondicerianus*), Biter (*Coturnix coromandelicus*), Saras crane (*Antigone antigen*) are common in the tract.

10.5.5. REPTILES: Snakes are found all over the tract. Every year hundreds of human death occurs due to snakebite and improper medical attention. Crocodiles are found in Wainganga river near deep dohs (deeper tract of river belt). Many types of lizards including monitor lizards are found in tract.

10.5.6. The forest dwellers eat lizards, rodents and many other animals, which are not poisonous. Before the introduction of Wildlife Protection Act 1972, village Patels used to do shikar and distribute the meat to the villagers. This system is now not in practice.

SECTION: 10.6: LEGAL POSITION:

10.6.1. Wildlife Protection Act, 1972 and rules framed under it are in enforcement to the tract. Other rules and regulations pertaining to protection are also applicable. Recent amendments to wildlife protection Act 1972 have been made for strict protection of wildlife in protected areas. The concept of Community Reserve and Protected Reserves has been forwarded to protect the wildlife out side the Protected Areas and Reserved Forests.

SECTION – 10.7:CENSUS AND POPULATION:

Census shall be carried out regularly as per the direction of Wildlife wing of the Forest Department. Census will give details about herbivores and carnivores ratio, male and female ratio of a species, increase and decrease in population and details about endangered species.

10.7.1 CARNIVORES:

As per 2005 census only 6 panthers were recorded and no tiger was reported by the Dy. Conservator of Forests, Gadchiroli. Absence of tiger in the Gadchiroli division shows the alarming situation as far as the protection of wildlife is concerned

10.7.2. HERBIVORES:

As per 2005 census population of Chital-55, Sambar-64, Bhedki-73, Neelgai-36, Wild boar-182, Fox-100, Tadas-2, Wild dog-9, Common langur-192, Pea-cock-4, Mongoose-3, Porcupine-5, Jangal cat-8, Sloth bear-12, Four-horned antelope-6 for found in Gadchiroli division. However, these figures are only estimation of various species that are existing in the division. Actual population may be slightly more and it needs proper care and protection.

SECTION-10.8: JOINT FOREST MANAGEMENT & WILDLIFE MANAGEMENT

10.8.1: Wildlife Week should be celebrated in all JFM villages from 1st to 7th October of every year and nature awareness camps should be organized for the

school children in which drawing, essay writing, quiz competition about wildlife will be conducted. They should be taught about the ecological balance of the nature. They should be shown wildlife films. The fund flow for wildlife management will be shared by the Joint Forest Management Committees, if they successfully protect the wildlife and their habitat. The JFM Committees should be rewarded if they give information regarding illegal poaching.

SECTION-10. 9: NATIONAL WILDLIFE ACTION PLAN (2002-2016)

10.9.1: PREAMBLE

10.9.1.1. BACKGROUND:

The first National Wildlife Action Plan (NWAP) was adopted in 1983, based upon the decision taken in the XV meeting of the Indian Board for Wildlife held in 1982. The plan had outlined the strategies and action points for wildlife conservation, which are still relevant. In the meanwhile, however, some problems have become more acute and new concerns have become apparent, requiring a change in priorities. Increased commercial use of natural resources, continued growth of human and livestock populations and changes in consumption patterns are causing greater demographic impacts. Biodiversity conservation has thus become a focus of interest. The National Forest Policy was also formulated in 1988, giving primacy to conservation. Hence, this new National Wildlife Action Plan.

10.9.1.2. OVERVIEW:

- (i) The term Wildlife encompasses all uncultivated flora and undomesticated fauna. Every species has right to live and every threatened species must be protected to prevent its extinction.
- (ii) Water, wilderness and wildlife are irrevocably interlinked. With mounting agricultural, industrial and demographic pressures, wilderness areas, which are the richest repositories of wildlife and biodiversity have either shrunk or disappeared. Their continued existence is crucial for the long-term survival of biodiversity and the ecosystems supporting them.
- (iii) Effective ecosystem conservation is the fundamental of long-term ecological and economic stability. Natural processes, forests and other wildlife habitats recharge aquifers, maintain water regimes and moderate the impact of floods, droughts and cyclones. Thereby they ensure food security and regulate climate change. They are also a source of food, fodder, fuel and other products supplementing the sustenance of local communities.
- (iv) India ranks sixth among the 12 mega biodiversity countries of the world. Conservation of biodiversity is directly linked with conservation of ecosystems and thus with water and food security. These together constitute a major plank of Indian economy.
- (v) National planning has not taken into account the adverse ecological consequences of shrinkage and degradation of wilderness from the pressures of population and commercialization. As a result, we have witnessed the alarming

erosion of our natural heritage, which comprises rivers, aquifers, forests, grasslands, mountains, wetlands, coastal and marine habitats, arid lands and deserts. This has also affected natural phenomena such as breeding, ranging and migration of wildlife and geomorphologic features

(vi) The increased frequency and intensity of natural disasters, the plummeting fertility of our soils and the accelerated degradation of our fresh water resources have imposed a crippling financial burden on the nation. This underscores the need to realign development priorities to take into account ecological imperatives including the protection of wild species, which sustain and enhance natural habitats, even as they depend on such areas for their survival.

(vii) Rural development for communities inhabiting forestlands and other wilderness regions suffers both from inadequate resources and inappropriate measures. It has failed to address their strong dependence upon natural biomass resources vis-à-vis the shrinking and degrading resource base. Farm productivity has also declined due to lack of proper support, causing impoverishment and enhanced pressures upon natural areas. Resource impoverished communities have therefore begun to place even greater pressure on the biomass of our forests and has led to widespread alienation of people from the goals of nature conservation efforts.

(viii) Habitats loss caused by development projects such as dams, mines etc. compound the problems of wildlife conservation.

(ix) The constraining impact of habitats loss has been compounded by illegal trade fuelled by a rising demand of wildlife products and their lucrative prices in the international markets.

10.9.2. POLICY IMPERATIVES

10.9.2.1: ECOLOGICAL SECURITY:

To protect the long-term ecological security of India, the national development agenda must recognize the imperative of identifying and protecting natural ecosystems from over-exploitation, contamination and degradation. Short-term economic gains must not be permitted to undermine the ecological security.

10.9.2.2: PRIORITY TO CONSERVATION:

Assigning conservation a high priority both at the level of central and state governments is an imperative. Its integration in all development programmes, evolving appropriate funding mechanism, enhancement of financial allocations and provision of adequate personnel with requisite expertise has to be ensured, to arrest the ongoing trend of degradation and to restore wildlife and its habitats.

10.9.2.3: NATIONAL LAND USE POLICY:

The NWAP cannot be implemented in isolation. Wildlife conservation cannot be restricted to national parks and sanctuaries. Areas outside the protected area network are often vital ecological corridor links and must be protected to

prevent isolation of fragments of biodiversity, which will not survive in the long run. Land and water use policies will need to accept the imperative of strictly protecting ecologically fragile habitats and regulating use elsewhere.

10.9.2.4: PRIMACY FOR WATER AND SUSTENANCE:

Water must be recognized as a prime product of natural forests. Forests must be managed to optimize and protect hydrological systems. The National Forest Policy of 1988, which emphasizes conserving our natural heritage in the form of natural forests, flora and fauna, is in consonance with this imperative. A critical imperative is also to recognize forests, wetlands and other natural habitats as a source of survival for millions of people, in particular as a source of NTFP and aquatic resources.

10.9.2.5: IN SITU CONSERVATION:

Primacy must be accorded to in situ conservation. Ex situ measures in zoological parks and gene banks may supplement these objectives, without depleting scarce wild resources.

10.9.2.6: PEOPLE'S SUPPORT FOR WILDLIFE:

Local communities traditionally depend on natural biomass and they must, therefore, have the first lien on such resources. Such benefits must be subject to assumption of a basic responsibility to protect and conserve these resources by suitably modifying unsustainable activities. Conservation programmes must attempt to reconcile livelihood security with wildlife protection through creative zonation and by adding new Protected Area (PA) categories in consultation with local communities, such as an inviolate core, conservation buffer, community buffer and multiple use areas.

10.9.2.7: MAN-ANIMAL CONFLICT:

While increasing man-animal conflict is an outcome of shrinkage, fragmentation and deterioration of habitats, it has caused destruction of wildlife and generated animosity against wild animals and protected areas. This is a crucial management issue, which needs to be addressed through innovative approaches.

10.9.3. STRATEGY FOR ACTION:

Adopting and implementing strategies and needs outlined above will call for action covering the following parameters:

- (i) Strengthening and enhancing the Protected Area Network.
- (ii) Effective Management of Protected Areas.
- (iii) Conservation of Wild and Endangered Species and Their Habitats.
- (iv) Restoration of Degraded Habitats outside Protected Areas.

- (v) Control Poaching, Taxidermy and Illegal Trade in Wild Animal and Plant Species.
- (vi) Monitoring and Research.
- (vii) Human Resource Development and Personnel Planning.
- (viii) Ensuring People's Participation in Wildlife Conservation.
- (ix) Conservation Awareness and Education.
- (x) Wildlife Tourism.
- (xi) Domestic Legislation and International Conventions.
- (xii) Enhancing Financial Allocation for Ensuring sustained Fund Flow to the Wildlife Sector.

Integration of National Wildlife Action Plan with Other sectoral Programmes.

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CHAPTER XI

ECOTOURISM IN THE TRACT

SECTION- 11.1: WHAT IS ECOTOURISM?

11.1.1. According to World Tourism Organisation (WTO), "Tourism that involves traveling to relatively undisturbed natural areas with specified object of studying, admiring and enjoying the scenery and its wild plants and animals, as well as any existing cultural aspects (both of the past or the present) found in these areas" is defined as ecotourism. Nature tourism (ecotourism) is distinguished from mass tourism or resort tourism by having a lower impact on the environment and by requiring less infrastructure development.

11.1.2 The tract dealt with has potential for eco-tourism and at present an ideal environment having distinct vegetation cover, enchanting mountain ranges and bewitching river flows and above all unique tribal population and their distinct cultural and social life.

SECTION-11.2 FORESTS OF GADCHIROLI:

Gadchiroli forests have distinct floral variation. The beautiful lofty trees, dense *bamboo* forests and unlimited herbs and shrubs, spiraling climbers embracing and curling the trees, chirping of jungle fowl, peacock and other birds with serene voices of barking deer, prancing herds of Chital, wandering of Sambars and Nilgai, cunning Leopard are bound to attract any body with passion to watch the nature.

11.2.1. FOLK DANCE AND FOLK-LORE OF TRIBALS:

Tribals of Gadchiroli present a distinct Madia dance and have folklore to be muse the passionate viewing and hearing.

SECTION- 11.3: SPECIAL OBJECTS OF MANAGEMENT:

11.3.1. Referring to National Wildlife Action Plan, 2002, special objects of management of ecotourism are spelt out. The national policy on tourism stipulates that tourism should become a unifying force nationally and internationally, fostering better understanding through travel. It should also help to preserve, retain and enrich our world-view and life-style, our cultural expressions and heritage in all its manifestations. The prosperity that tourism brings should strengthen and cause accretion, rather than damage, to our social and cultural values and depletion of our natural resources. Realization of these policy objectives particularly in context of ecotourism would involve a selective approach, scientific planning, effective control and continuous monitoring. The developmental process itself should meet the following principles:

- (i) It should involve the local community and lead to the overall economic development of the area.
- (ii) It should identify the likely conflicts between resource use for tourism and the livelihood of local inhabitants and attempt to minimize such conflicts.
- (iii) The type and scale of tourism development should be compatible with the environment and socio-cultural characteristics of the local community.
- (iv) It should be planned as a part of the overall area development strategy, guided by an integrated land-use plan and associated with commensurate expansion of public services.

11.3.2 Based on above cardinal guidelines, the special objects of management are as follows:

- (i) Development of eco-tourism in the tract dealt with will be without disturbing the socio-cultural and ecological environment of the area or with least impact on it.
- (ii) Participation of local people in the development of eco-tourism and their overall socio-economic development.
- (iii) To involve governmental and non-governmental agencies to generate awareness regarding environment and the people residing in that environment and to work for their well beings with dignity.

SECTION-11.4: ECOTOURISM CENTERS:

Many places have been identified as eco-tourism centers in Gadchiroli Division, they are as follows:

- (1) Gadchiroli:** Gadchiroli is the Headquarter of Gadchiroli Forest Division. It is the district place. It is situated on the bank of Wainganga River. It is a seat of Tribal art and culture. Near to it one can find Tussar Cultivation (Sericulture).
- (2) Chatgaon:** It is 17 kilometer to the east of Gadchiroli. One will find Medicinal Garden, SEARCH Centre etc . in Chatgaon. Tribal folklore may be enjoyed on any occasion.
- (3) Michagaon Khurd:** Near Michagaon Khurd village, there is a Medicinal Plant Development Centre known as Gadmouli. It has been established by FRLHT in compartment number 426 over 200 ha area.
- (4) Mendha (Lekha):** Mendha is a village situated near Dhanora. It is a tribal village. Here one will find tribal art, dance and culture with tribal hospitality. Joint Forest Management concept has been successfully implemented here. People

are proud of their efforts in conservation and protection of forests with their dedicated efforts. It is an ideal village in its natural surrounding.

- (5) **Godalwahi:** On Dhanora-Pendhari road there lies a village Godalwahi which has unique forest. Lofty *Teak, Bija, Ain, Dhoban, Moha, Tendu, Tiwas, Salai, Shivan, Semal* etc trees cover the tract with chirping of several birds, prancing of Deer, Sambar, Nilgai, Panther, Bear etc and dense bamboo clumps enchant everyone.
- (6) **Bhawaragarh:** Three kilometer away from Dhanora, there is a religious place known as Bhawaragarh, situated on a hillock. It is in the midst of natural vegetation and wildlife. Annual festival of Jatra is organised by the tribals.
- (7) **Tippagarh:** It is near to Nehakal village in Murumgaon range. It is a mountain fort. On the top of the mountain there is beautiful water tank, which serves as origin of river Tipagarh. Fort is reminiscent of Gond Kings.

SECTION-11:5: ROLE OF FOREST DEPARTMENT:

11.5.1 Eco tourism in the remote forest areas of the District should be given top priority and in this regard the instructions issued by Principal Chief Conservator of Forests, M.S. Nagpur vide standing order no.002 (No.CCF/PT&SP/416 dated 7th February 2002 should be strictly followed by Deputy Conservator of Forests, Gadchiroli Forest Division has been given in Appendix No.LXVIII of volume II.

11.5.2 The prominent water bodies and specific habitat sites in the division are proposed as sites for creation of Eco-centers with facilities of nature interpretation and eco-tourism.

11.5.3 Each Eco-center is proposed to have the following components as its integral part of the programme.

- (i) Nature interpretation and awareness centers which tell about the importance of the area, people and their culture.
- (ii) Audio-visual Aids and equipments, including films and documentary related to the conservation of environment, forest, wildlife and local customs of people.
- (iii) Eco-tourism camps to provide recreation, and education through organization of tracking programme, botanical tours to students of local schools and colleges.
- (iv) Watch towers with binoculars, wireless handsets shall be provided.
- (v) Water sports facilities on eco-centers at water bodies

11.5.4 The villages adjoining to these centers are proposed to be taken up under eco-development program for their overall development.

11.5.5 It is also prescribed to improve the worship sites of the local people as a part of people's participation in the eco-development and allied activities.

11.5.6 Archeologically important sites identified by the Archaeological Survey of India or the State Department of Culture shall be delineated and marked on the divisional/range maps to serve as focal sites for eco-tourism.

11.5.7 Awareness generation campaign shall be taken up to involve local villagers and JFM committees in the wildlife conservation programme.

11.5.8 Eco-tourism centers should have good approach roads, transportation facilities, interpretation centers, signs, observation towers, adequate but unpretentious lodging and dining facilities, garbage disposal facility and other utilities as per the requirement.

11.5.9. Teaching institutions viz. schools, colleges, nature and wildlife lovers shall be involved through nature interpretation camps, wildlife film shows, exhibitions, seminars competition etc.

11.5.10 The division will also provide information and interpretation services. It will be in the form of brochures, leaflets, specialized guides, and visitor information centers etc. The visitors are advised to abide by the guidelines prepared for them.

SECTION-11.6: ROLE OF NON GOVERNMENT ORGANISATIONS / SCIENTIFIC AND RESEARCH INSTITUTIONS:

11.6.1 Non Government Organisation / Scientific and Research Institutions are welcome to take lead in ecotourism in the tract. It will be taken in the form of following practices:

- (i) Create awareness, amongst all concerned, about the importance of eco-tourism.
- (ii) Motivate the local community to increase their involvement in eco-tourism activity.

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CHAPTER XII

FOREST PROTECTION IN THE TRACT

SECTION: 12.1: NEED FOR FOREST PROTECTION:

12.1.1: Gadchiroli Forest Division is geographically one of the most remote tracts of Maharashtra State. The tract dealt with is not only remotest part but is socially, educationally and economically the most backward area of Maharashtra. There is no infrastructure for the development of the tract. The land holdings in this tract are meager, as forest areas constitute about 70% of total geographical area of the division. Hence Industrial development is totally absent in the tract. So that per capita income is lowest in this tract with comparison to that of average for Maharashtra State. The dependence of people on forests is obviously more in the tract.

12.1.2. Though the availability of forest produce is more, due to absence of market, the protection of forest from illicit felling is not a major problem in this tract. Organized illicit felling is seldom reported here.

12.1.3. Being the deciduous forests and hot temperature, the tract is vulnerable for fire. The cause of fire is mainly due to the negligence of wayfarers, grazers and MFP collectors. The nature of fire is generally ground fire. The regeneration is badly affected due to fire incidences. Many species suffer die back in establishing the seedlings. Even, production of good fodder grasses suffers. Many herbaceous species are also damaged due to fire. Wildlife, also, suffer from the burnt of fire.

12.1.4. Grazing is another serious biotic pressure, which leads fast degradation of forests. The carrying capacity of the tract is 234,000 cattle units. The total cattle unit in the tract is 159,000. If the cattle are allowed to graze uniformly in the entire forests all the time, then, the impact of grazing will be negligible. But the concentration of cattle grazing is more around the villages hence the impact of grazing around the villages is tremendous and forests around the villages are badly degraded. Forests around the villages are deprived of regeneration due to over grazing and trampling of seedlings. Seedlings seldom get established here. Hence the ground storey is completely devoid of vegetation near the villages.

12.1.5. Under the influence of naxalite activities, forests of Gadchiroli are facing crucial problem of encroachment. The reported encroachment on forestland is given in the following table.

Table No.-79
Encroachment status

Sr. No	Period	No. of encroachers	Area under encroachment (in ha.)
1	Upto 1978	979	1167.43
2	After 1978	1452	1510.51
Total for division		2431	2677.94

The encroachment in the forest is taking place very often. In many cases these encroachments are not reported due to threat from Naxalites.

12.1.6. Poaching of wildlife in the tract is not so prominent due to the presence of Naxalites activities. But the hunting of wild animals by the local tribes is sometimes reported. Even traditional hunting is not so common. But rare cases of hunting of carnivore or seizure of articles/trophies of carnivore are reported in the tract.

12.1.7. The tract is bestowed with presence of major mineral like Iron Ore. Mining of Iron Ore is not yet started. Hence the question of illegal mining does not arise.

SECTION: 12.2: ILLICIT FELLING:

12.2.1. Illicit felling of forest takes place mainly to meet the demand of firewood, small timber and timber for agricultural implements, construction of houses and furniture by the local people. Though organized illicit felling is not reported, the loss due to illicit felling varies from 10 to 20 lakhs per year. Rare incidences of illegal transport of forest produce/timber are reported, in which the vehicles used in the offence are confiscated under the relevant sections of Indian Forest Act, 1927.

SECTION:12. 3: PROTECTION FROM ILLICIT FELLING:

12.3.1. To protect the valuable forest from the illicit cutting and to check the illegal transit of forest produces it becomes necessary for the Forest Department to have special efforts. The reported illicit felling of trees is given below in the table.

Table No. -80

Year	No of trees felled	Loss Rs. In lakhs.	Recovered Rs. in lakhs
1996	9823	10.68	8.91
1997	15172	12.14	5.43
1998	10316	20.38	9.76
1999	6784	10.86	9.98
2000	8784	26.84	21.95
2001	7304	32.17	18.61
2002	6658	27.87	22.32
2003	9535	27.53	21.00
2004	8052	16.41	13.98
2005	10349	18.20	12.81

From the above data the number of illicitly felled trees has not decreased during the last 10 years. The Dy. Conservator of Forests, Gadchiroli has to take special measures to control the illicit felling. The following measures may be strictly followed.

12.3.2. SPECIAL PROTECTION CAMPS:

As the tract does not have major threat for illicit felling, no special efforts are essential. But preventive measures are to be taken in advance to check

any such unwanted events; it is proposed to have Special Protection Camps at strategic points. It is hereby proposed to create special protection camps at following places:

Table No. -81

TABLE SHOWING PROPOSED SITE FOR PROTECTION CAMPS

Sr No	Name of the Site	Range	Remarks
1	Gadchiroli	Gadchiroli	It is the Division Head Quarter and has following State Highways viz. Gadchiroli-Mul, Gadchiroli-Armori, Gadchiroli-Dhanora, Gadchiroli-Potegaon and Gadchiroli-Chamorshi. To protect the forest and control illegal transit of forest produce, special protection camp at Gadchiroli is needed.
2	Dhanora	Dhanora	It is the Range Head Quarters of North and South Dhanora and is connected by State Highways to Gadchiroli, Pendhari, Murumgaon and Chhattisgarh State.
3	Murumgaon	Murumgaon	It is the Range Head Quarters of East and West Murumgaon and is connected by State Highways to Dhanora, Kurkheda, and Chhattisgarh State.
4	Pendhari	Pendhari	It is the Range Head Quarter of Pendhari and is connected to Dhanora, Potegaon, Kasnsur and Chhattisgarh State through State Highways.

Special Protection Camps will have 3 Foresters, 12 Forest Guards, 6 Forest Laborers and a vehicle. At each station the forest staff will be doing their duties in three shifts throughout day and night. Wireless network will connect these special protection camps with forest check posts and control rooms. The protection staff should be given Mobile phones and fast moving vehicles fitted with wireless sets.

12.3.3. SPECIAL CHECK POSTS/NAKAS:

State Highway is passing through the tract connecting two States namely Maharashtra and Chhattisgarh. State Highway also links the tract with other parts of Maharashtra. To have proper check on transit of forest produces through the tract it hereby proposed to erect check posts at strategic places. These check posts must be duly notified by the competent authorities and published for the benefit of public and other law enforcing authorities. The strategic points identified are:

Table No. -82
PROPOSED CHECK-POSTS

S. No.	Place	Range	Site
1	Sawrgaon	East Murumgaon	On State Highway
2	Pendhari	Pendhari	On State Highway
3	Gadchiroli	Gadchiroli	On State Highway

These check posts should be manned by Forest Guards and Van Majoor in rotations to have effective control. These posts must be linked with special camps by wireless connections or walkie talkies. Special Camps must give support to these check posts as and when required all over the day and night.

12.3.4. The Government vide letter No TRS 1087/102380/F-2 R & FD, dated June 18, 1981 has stated that all illicit cutting value of Rs 25,000/- and more at a place should be reported to the Government, the Chief Conservator of Forests and the Conservator of Forests by the Deputy Conservator of Forests within three days of the receipt of the report from the RFO.

12.3.5. The following time schedule has been prescribed for inspection of illicit cutting area by the respective officers:

Sr. No	In situ value of illicit cutting at a place	Designation of the Inspecting Officer	Period within which inspection should be completed
1	2	3	4
1	Upto Rs 50000	RFO	3 days from detection /receipt of intimation of detection.
2	Above Rs 50000 but not exceeding Rs 2,00,000	ACF	3 days from the receipt of information.
3	Above Rs 200000 but not exceeding Rs 500000	Dy.C.F.	3 days from the receipt of information.
4	Above Rs 500000	CF	7 days from the receipt of information.

12.3.6. Vide letter No TRS-1082/36/F-6, dated September 8, 1982 the Government has stated that the offence involved worth above Rs 2000/- should be necessarily filed in the court for prosecution.

12.3.7 BEAT CHECKING:

To ensure strict protection of forest, it is necessary that the protection staff should vigilantly perform patrolling in the forest and the officers concerned should also exercise effective supervision. It is essential that every forest offence is to be reported promptly whether the offender therein is apprehended or not and whether the forest produce involved therein is recovered or not. As per the standing order 37, Chapter IX, instructions issued for guidance and strict compliance for effective protection of forests are as follows:

12.3.8. The primary responsibility of forest protection vests on the protection staff, who generally detects and report the offences. The duties and responsibilities with regard to each category of staff are broadly specified below:

12.3.9. BEAT GUARD:

The basic duty of a beat guard is to patrol his beat regularly and protect his beat from illicit cutting, grazing, fire and encroachment. He should thoroughly inspect the entire forest within his charge every fortnight and issue POR for all the damage detected in his beat.

12.3.10. ROUND OFFICER:

Each Round Officer will inspect each beat once in three months. He should verify and assess the damage not reported by the Beat Guard. He should submit his inspection report punctually to the Deputy Conservator of Forests Gadchiroli through the concerned territorial Range Forest Officer.

12.3.11. RANGE FOREST OFFICER:

It is the prime responsibility of the RFO to ensure that all round officers and guards carry proper patrolling in the forests. He should inspect at least 1/4th area of the beats once in three months and report should be submitted to the Dy.C.F. punctually. In case of extensive illicit felling he will take prompt measures to inspect the beat thoroughly.

12.3.12 HIGHER OFFICERS:

Higher Officers, during their tours, will inspect specific areas vulnerable to illicit felling. At least one day in a fortnight will be devoted to check the illicit felling of trees, apart from normal inspection.

12.3.13 TRANSIT RULES FOR FOREST PRODUCE:

12.3.14 The transit of forest produce is regulated as per the Bombay Transit of Forest Produce Rules, 1960, which were published by the Agriculture and Forest Department under NoIFA-1057/22947-(VI)-J, dated April 23, 1960.

12.3.15 The Government of Maharashtra vide Notification No TRS/1083/91822 (ii) CR-87/F-6, dated May 13, 1985 has amended Section 61 of Indian Forest Act, 1927 making the law more stringent. It has authorized Assistant Conservator of Forests and above, to be called as authorized officer for the purpose of this Act, who are competent to confiscate the vehicle, instruments, forest produces etc involved in the forest offence related to the illicit removal of notified forest produces.

12.3.16 To facilitate issuing of passes, the Government vide TRS/1089/PK-267/89/F-6, dated May 14, 1990 has stated that the decision regarding the issue of passes, to an applicant should be taken within 45 days from the date of application.

SECTION: 12.4. FIRE PROTECTION**12.4.1 FIRE:**

Fire occurs during March to May in each year and causes loss to the productivity of forests through burning of valuable leaf litter and humus. Further it affects the soil fertility, micro flora and fauna existing in the area. Damage is also caused to young regeneration. Large No. of wind fallen trees burnt every year during fire season. Major part of the area is burnt each year. The main reasons for forests fire are due to the negligence of wayfarers and MFP collectors. Sometimes the honey collectors and poachers also cause fire to drive away the honey bees and animals which results spreading of fire in the whole area.

Table No.-83

**STATEMENT SHOWING FOREST AREA BURNT DUE TO FIRE DURING LAST
TWELVE YEARS IN GADCHIROLI FOREST DIVISION**

Division	Year	Total Area in Ha.	Forest Area burnt in Ha.	Un-burnt Forest area	% area burnt
Gadchiroli Forest Division	1993-94	218529.27	1422.00	217107.27	0.65
	1994-95	218529.27	355.00	218174.27	0.16
	1995-96	218529.27	8.00	218521.27	0.003
	1996-97	218529.27	213.50	218315.77	0.10
	1997-98	218529.27	53.00	218476.27	0.02
	1998-99	218529.27	28.00	218501.27	0.01
	1999-00	218529.27	236.50	218292.77	0.10
	2000-01	218529.27	703.63	217825.64	0.32
	2001-02	218529.27	513.20	218016.07	0.23
	2002-03	218529.27	262.80	218266.47	0.12
	2003-04	218529.27	17.00	218512.27	0.01
	2004-05	218529.27	83.00	218446.27	0.04

12.4.2 The forests are valuable and need careful fire protection over the entire area. Hence special efforts are needed for proper fire control. For the purpose of fire protection the areas are classified as follows-

12.4.3 CLASS I: FORESTS COMPLETELY PROTECTED: This class includes:

- (i) All plantations.
- (ii) All forests of Protection Working Circle and all main felling and thinning coupes of Selection cum Improvement Working Circle, *Teak* Plantation Working Circle and Improvement Working Circle.
- (iii) All regenerated coupes of all working circles till; the young crop has attained an age of 10 years.
- (iv) All Government Timber Depots.
- (v) Any other areas of special importance ordered by the Conservator of Forests.

12.4.5 All areas in this class will be isolated by means of fire lines and they will be patrolled by firewatchers. Any fire incidence in these areas must be reported to the Deputy Conservator of Forests Gadchiroli in writing giving the details of area burnt and losses occurred to the forest crop.

12.4.6 CLASS II: FORESTS GENERALLY PROTECTED: This class includes:

- (i) The remaining areas of Improvement Working Circle and Selection-cum-Improvement Working Circle.
- (ii) Such other areas as the Conservator of Forests North Chandrapur Forest Circle may direct for some special reasons.
- (iii) All areas in this class will be isolated from the surrounding area by means of external fire lines and will be divided into convenient blocks of interior fire lines.
- (iv) Firewatchers may be engaged for patrolling in this area.

12.4.7 CLASS III: FORESTS PROTECTED BY LAW ONLY:

All other forests not included in the above two classes, are included in this class. In these forests deliberate burning is prohibited but no special measures of protection will be undertaken.

12.4.8 The following will be maintained as fire lines:

- (i) All external Reserve Forest boundary lines to a width of 12 meters.
- (ii) 6 meter wide lines around all plantations up to 10 years from the year of planting.
- (iii) 3 meter wide coupe boundary lines for period of 10 years from the year of main felling.
- (iv) 3 meter wide line on both sides of all roads and Cart tracks passing through the forests.
- (v) 40 meter wide line on all sides of the timber, bamboo and fire wood depots.

12.4.9 TO REDUCE THE POSSIBILITY OF FOREST FIRE THE FOLLOWING SHOULD BE OBSERVED:

- (i) The cutting and cleaning of fires lines should be completed by the end of December and burning should be completed before the end of February.
- (ii) Dry leaves and other dry materials on fire lines must be collected from time to time and deposited along the edge of the fire lines and burnt before the fire season starts.
- (iii) No fire lines shall be burnt after the end of February.

12.4.10 LEGAL PROVISIONS AVAILABLE:

Under the relevant sections of Indian Forest Act, 1927 and rules framed under it, forest fire can be controlled effectively.

12.4.11 STEPS TO BE TAKEN TO CONTROL FIRE:

12.4.11.1. CUTTING AND BURNING OF FIRE LINES:

The cutting of fire lines will be completed by the end of December and burning will be completed before the end of February. Dry leaves and other dry material on fire lines will be collected from time to time and deposited along the edge of fire lines and burnt before the fire season starts. No fire lines will be burnt after the end of February. If possible, modern fire fighting tools will be used for extinguishing the fire.

12.4.11.2 Fire Watchers:

- (i) The firewatchers will constantly patrol along the fire lines in the areas assigned to them. The fire lines should be entirely free from the inflammable materials. As soon as a forest fire occurs the firewatcher should inform to the concerned Beat Guard and assist him in procuring the manpower from the nearby areas and also help in extinguishing the fire. The firewatchers should not leave their areas till the fire is completely extinguished. The firewatchers should not carry any inflammable materials in the forests. Watch towers will be constructed at elevated points to detect the fires at distant places.
- (ii) The persons involved in lighting of fires are mostly local villagers. Therefore, it is essential to have an open dialogue with them and made aware of the disastrous effect of forest fire. Boards having slogans such as “ One tree can give one crore match sticks, but one match stick will destroy one crore trees” should be displayed at strategic points. The areas vulnerable to fire should be identified around each village and group of firewatchers of that village will be employed under Joint Forest Management. The money meant for fire protection will be directly given to Joint Forest Management Committees.
- (iii) Before fire season starts, a fire protection scheme will be prepared by Dy.C.F. and get it sanctioned from Conservator of Forests, North Chandrapur Circle, and implemented.
- (iv) The staff engaged in the fire protection works will supervise the work of firewatchers and will coordinate.
- (v) The vehicles will be made available to the staff to transport the fire fighting Labourers, water and other equipments required for fire fighting.
- (vi) The regeneration area of Selection-cum-Improvement Working Circle, Old Teak Plantation Working Circle, and Improvement Working Circles will require special efforts.

12.4.5. RESPONSIBILITY:

12.4.5.1. The Range Forest Officer will be held responsible for the efficient fire protection in his range.

12.4.5.2. Similarly the Deputy Conservator of Forests Gadchiroli will be held responsible for carrying out all protective and prohibitive measures efficiently in his division.

12.4.5.3 Deputy Conservator of Forests Gadchiroli must satisfy himself that the external fire lines and other internal fire lines have been properly cleared and burnt thoroughly before the end of February. He must frequently visit the areas where the incidences of fire occurrence are common.

12.4.5.4. The Deputy Conservator of Forests Gadchiroli must satisfy himself during his field inspections that all fire incidences have been reported. A strict watch should be kept on the tendu contractors and their agents who engage local people to put fire to the forest floor to get a good flush of tendu leaves. These fires are generally put between 1st of March and 15th of April each year.

12.4.6. FIRE REPORTS:

12.4.6.1: The Range Forest Officer shall report the fire incidences in his Range to the Deputy Conservator of Forests Gadchiroli immediately. After the fire is extinguished a detailed final report covering the area burnt, damage to the forests and other details along with a sketch map should be submitted to the Deputy Conservator of Forests Gadchiroli within 15 days after thorough inspection of the burnt area by himself.

12.4.6.2: Deputy Conservator of Forests Gadchiroli will submit monthly return (in prescribed preformed Form No IX-74) to the Conservator of Forests showing the cause of fire, date and time of occurrence, extent of area burnt, damage and measures taken to extinguish fire. This report will cover:

- (i) All fires in class I areas.
- (ii) All fires that have occurred in class II areas after the completion of fire line burning works.
- (iii) All fires that have occurred in class II areas before completion of fire line burning works. All records of fires must be shown on maps of scale 1": 2 mile and the record the fire incidences in the compartment history and the map will be attached to it.

12.4.6.3: A fire record will be maintained in the office of the Deputy Conservator of Forests. All fire lines burnt should be indicated on the map. Incidence of fires in class I, II and III areas in each range will be serially numbered in chronological order and the details of areas burnt will be shown on the map.

12.4.6.4: Areas deliberately burnt for silvicultural reasons e.g. to destroy felling debris or to stimulate reproduction will be excluded from the schemes of fire protection. Such fires will not be reported unless they spread into a protected area.

Deliberate burning is only permissible if prescribed in the working plan or sanctioned by the Conservator of Forest.

12.4.6.5: Financial loss due to fire will be communicated to the Accountant General as per Control Form.

SECTION 12.5: ENCROACHMENT:

12.5.1 Gadchiroli Forest Division has got the population of small and marginal farmers distributed throughout 369 villages and most of the cultivated areas are adjacent to the forest areas. The average size of land holding is 0.5 to 2 ha. With growing population and increasing demand for the food-grains and clothing, the tendency of encroaching the adjacent forest areas by clearing, girdling of trees is a regular feature resulting in honeycombing of the area. A total area of 2677.94 ha. of forestland is encroached upon by 2431 local inhabitants mainly the tribal and non-tribal farmers up to 2005. Due to naxal infestation and increasing awareness of their rights, the local inhabitants defy the government regulations and thereby causing forest staff to loose control over the area day by day. This results in illicit felling and encroachments, which causes enormous losses not only to forestland but also huge quantity of standing timber and non-timber forest produce. Except Moha trees, all other species of trees standing in the encroached areas are slowly girdled and burnt before starting actual cultivation of the area. Though the powers of eviction of the encroachments under Maharashtra Land Revenue Code, 1966 u/s 53, 54 and 54(a) are vested in the forest officers, it's use is practically very limited due to the fear of naxal activities in the district. Lack of proper demarcation is also one of the main reasons for encroachment of the area.

SECTION-12.6: POACHING:

12.6.1. Poaching of herbivore animals such as deer, sambar, nilgai, etc. by local people resulted in scarcity of prey to the important carnivores such as tiger, panther, etc.; their population has been showing alarming trend for the past 2 decades which resulted in disappearance of tiger from the Gadchiroli forest division. Illegal poaching and trading of tiger skins and hides has also been noticed since quite some time in the division.

Table No.84

TABLE SHOWING THE NUMBER OF WILD ANIMALS CAPTURED, HUNTED OR NATURALLY DIED DURING LAST TEN YEARS IN GADCHIROLI FOREST DIVISION

Year	No. of wild animals.						
	Species	Captured	Species	Hunted	Species	Naturally Died	Total 3+5+7
1	2	3	4	5	6	7	8
1993-94	--	--	Sambar	1	Sambar	1	3
	--	--	--	--	Nilgai	1	--
1994-95	Sambar	2	Wild boar	1	Panthar	1	4

1995-96	--	--	Ghodenil	1	--	--	2
			Panthar	1	--	--	--
1996-97	--	--	Panthar	1	--	--	1
1997-98	--	--	--	--	--	--	--
1998-99	--	--	Wild boar	1	Tadas	1	2
1999-00	--	--	--	--	--	--	--
2000-01	--	--	Sambar	1	--	--	1
2001-02	--	--	Antelope	1	--	--	2
	--	--	Sambar	1	--	--	--
2002-03	--	--	Sambar	1	--	--	2
	--	--	Nilgai	1	--	--	--
2003-2004	--	--	Sambar	1	--	--	2
	--	--	Nilgai	1	--	--	--
2004-2005	--	--	Chital	1	Chital	1	3
	--	--	--	--	Tadas	1	--
Total	--	2	--	14	--	6	22

SECTION-12. 7- GRAZING CONTROL:

12.7.1. The success of regeneration will depend upon the effective control on grazing and protection from fire. The cattle population in the villages around the forest area is very large. Due to large population of cattle, the forests are subjected to heavy grazing. Further the cattle population is not uniformly spread all over forest areas; therefore, some areas are more vulnerable to grazing.

For grazing control the following methods are adopted.

- (i) Villages are motivated to have only less number of productive cattle.
- (ii) Stall feeding is recommended
- (iii) Rotational grazing should be implemented.

12.7.2 A functional classification of the forest is given in section 2 of chapter I, Part II as enunciated in the grazing policy formulated by the Government of Maharashtra vide its resolution No MFP-1385/132211-Y, dated 8-12-1968. As per the provisions contained in A-259 of BFM Vol II, Part VI, coupes can be closed to grazing for a period up to 10 years or more where it is difficult to get successful regeneration in a shorter period.

12.7.3 SELECTION-CUM-IMPROVEMENT WORKING CIRCLE:

As per functional classification, this working circle comprises of tree forests and the maximum incidence of grazing prescribed for it is 1.2 ha per cattle unit. All main felling coupes will remain closed for grazing for a period of 10 years from the year of main felling. Thus with a felling cycle of 15 years, 5/15th or 1/3rd area will remain closed for grazing at any time after 5 years from the commencement of this plan.

12.7.4. IMPROVEMENT WORKING CIRCLE:

This working circle comprises of degraded forest and the maximum incidence of grazing prescribed for it is 0.8 ha per cattle unit. All main felling coupes will remain closed for grazing for 10 years from the year of main felling. Thus with a felling cycle of 10 years, 5/10th or 1/2nd area will remain closed for grazing at any time after 5 years from the commencement of this plan.

12.7.5. All the areas of forests are not opened for grazing at a time. Hence it is suggested that cattle exceeding the carrying capacity of the area should not be allowed for grazing in the forest. These exceeding cattle can be accommodated in the community lands of these villages by taking fodder development works with the help of Joint Forest Management Committee or voluntary agencies. At the same time the villagers will be encouraged for stall feeding. The villagers will be allowed to cut grass from the closed coupes. They will be made aware of the ill effects of excessive grazing. The rotational grazing is recommended in areas, which are not due for working. The experiment of silage preparation should be conducted and through this, stall feeding should be advocated. The preparation of silage will solve the problem completely. People should be motivated for rearing cattle of better breed to have better return.

12.7.6 Grazing rules made applicable vide Government of Maharashtra Revenue and Forest Department Resolution No MFP-1371/237035-Z, dated 3rd November 1973 have been given in **Appendix no. XLV of Volume II.**

SECTION-12. 8: ROLE OF JFM:

12.8.1: Joint Forest Management committees will be used as a tool in controlling illicit felling, encroachment, fire and grazing control. Constant dialogue with JFM committees should be made and emphasized the importance of protection of forest from illicit felling, encroachment, fire and unauthorized grazing. The committees will be given the amount allotted for fire protection works if it successfully protect of the forests from fire. In such way JFM Committee will get employment as well as goodwill of forest department. Effective involvement of people will generate better environment for protection of forest from illicit felling, encroachment, fire and grazing.

SECTION-12. 9: CONTROL OF NAXALITE ACTIVITIES:

12.9.1: In Gadchiroli Forest Division the law and order condition is not normal as the tract is fully infested with infiltration of Naxalites from Andhra Pradesh and

Chhattisgarh. Local lads are also joining the hands with these Naxalites. As the forest area constitute about 70% of the total geographical area the impact of naxalite activities is felt more on Forest Department. Though their major target is Police and Revenue, the Forest Department is also equally affected. The forest persons are beaten severely by the naxalites while performing their duties in the forests. So that they are unable to render their normal duties in such conditions. Hence, it is proposed that the State Government should take necessary steps against these naxalite activities in the tract as soon as possible. Otherwise, the forest cover of the tract will gradually turned into degraded lands.

Besides that all the social beneficiary schemes in the villages should be implemented with active involvement of the forest staff including Range Forest Officers, Foresters and Forest Guards working in that area. Forest staff quarters at beat, round and range level should be constructed in groups and adequate protection by S.R.P.F. or any other means should be provided.

Sufficient funds from the State Government or Zilla Parishad should be given to forestry sector so that regular work will be carried out throughout the year and villagers can get regular employment.

All the staff in the field should be given intensive training to deal with the social problems and also all the forest personals should be adequately equipped with information and knowledge about legal rights of tribals and various individuals. Community oriented welfare schemes of the Rural and Tribal Department should be implemented with a view to integrate the approach of development of tribal and local people and protection and management of the forests.

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CHAPTER – XIII

OTHER IMPORTANT REGULATIONS

SECTION-13.1: DEMARCATION OF COUPE AND MARKING OF TREES

13.1.1. Coupes due for main felling will be demarcated and marked one year in advance except for the first coupe in which demarcation, marking and main felling will be carried out in the first year operation of the plan. The treatment map will be prepared by the RFO, which will be verified and countersigned by the ACF. After that a coupe demarcation certificate along with the treatment map will be furnished by the concerned RFO in the following format:

I,-----,RFO,-----
 -----certify that I have personally
 inspected the demarcation of coupe No-----in compartment
 No-----of----- FS-----
 -----WC on dated-----month -----year-----and
 have prepared the treatment map as per the prescriptions of the working plan for
 Gadchiroli Forest Division.
 The area of the coupe is-----ha.

Place -
 Date -

Signature
 Range Forest Officer, -----

Place-
 Date -

Countersign
 Assistant Conservator of Forests, -----

13.1.2. DEMARCATION OF COUPE

- i) Annual coupe will be demarcated by cutting and clearing bushy undergrowth on 3 m wide line and by erecting pillars or posts in the middle of the line at suitable intervals, except where the coupe boundary runs along a big nala, a fire line or a road. Coupe number, working circle and felling series will be written on the pillars on the side away from the area of the coupe.
- ii) Selected trees at suitable intervals, standing on the periphery of the coupe, will be given two coal tar bands and a geru or red band in between. The lower coal tar band will be at breast height and the other coal tar band will be 15 cm above it. Just below the lower coal tar band serial number in Arabic will be given on the side away from the area of the coupe. The serial numbers of such trees will be maintained in the marking register in the following format.

**PROFORMA FOR TREES ON THE PERIPHERY OF COUPE & GIVEN
SERIAL NUMBERS**

Serial Number	Species	Girth at Breast Height (cms)	Remarks.
(1)	(2)	(3)	(4)

For example, on the periphery of coupe, a teak tree will be given the required bands and serial number 45 in the marking register, the girth at breast height is 125 cms as follows:

Serial Number	Species	Girth at Breast Height (cms)	Remarks.
(1)	(2)	(3)	(4)
45	Teak	125	Not to be felled

- (iii) No trees bearing coupe demarcation bands will be marked for felling.

13.1.3. DEMARCATION OF SECTIONS:

- i) To control harvesting, each coupe marked for felling in SCIWC, IWC, AWC and Bamboo (Overlapping) Working Circles, will normally be divided into four approximately equal sections. Coupe Section will be demarcated by 1.5 m wide cut lines by clearing brushwood unless the section line runs along a permanent feature, e.g. nala.
- ii) Trees above 45 cm girth, selected at suitable intervals on the inner edge of the 1.5 m wide cleared section line will be given two coal tar bands 15 cm apart, the lower coal tar band being at breast height. Just below the lower coal tar band section number will be given on the side away from the area.

13.1.4. DEMARCATION OF PROTECTED AREAS:

Selected trees, on the periphery of the protected areas, will be given two geru bands 15 cm apart, lower band being at b.h. In addition, a cross mark (X) in geru colour between the bands will also be given on the side away from the protection areas. All those trees will be serially numbered. The serial number will be given just below the lower geru band, on the side bearing the cross mark. All the protection areas will be numbered in Roman numerals and the trees standing on the periphery of each protection area will be numbered in Arabic, adopting separate series for each area, so that the trees on the periphery of protection area № I will bear the Sr № I/1 and the similar trees on the periphery of protection area № II will bear the № II/1 etc. The serially numbered trees will be recorded in the following form.

Table No.- 85

Serial Number	Species	Girth at Breast Height (cms)	Remarks.
(1)	(2)	(3)	(4)
I/1	Tendu	140	Not to be felled
II/1	Dhaoda	90	Not to be felled
III/1	Teak	150	Not to be felled

13.1.5. DEMARCATION OF OTHER AREAS GIVEN IN THE TREATMENT MAP:

The other categories of areas will be demarcated by giving one geru band and one coal tar band. The geru band will be at b.h and the coaltar band will be 15 cm above it.

13.1.6. MARKING TECHNIQUES:

- i) All trees to be marked for felling will be given a geru band at b.h after removing the bark and will bear marking hammer marks both at b.h and base on a clear blaze of size: (10 cm x 10 cm).
- ii) The following trees in addition will bear digit serial No.at both b.h and base.

(a) All trees of *Teak, Bija, Shisham, Ain, Tiwas, Haldu, Karam, Dhaora and Shiwan* of 45 cm and over in girth at b.h.o.b.

(b) Trees of all other species of and above 60 cm girth at b.h.

- iii) All remaining trees marked will bear serial number, which will be given by coal tar. The digital and coal tar numbers will form separate series. Malformed trees alone will be recorded as fuel trees except that of teak. A tree will be classified as fuel tree only when it is incapable of yielding any useful sawn timber or pole.
- iv) All trees bearing serial number will be individually recorded in marking (recording) book giving following details:

Sr.No.		Species	Girth at bhob cm	Remarks
Digital	Coal tar			
1	2	3	4	5

- v) Abstract of trees marked for felling will be made in 15 cm girth classes. Timber, poles and firewood trees will be shown separately.

- vi) The number on the trees will be put in the vertical direction as shown below

Tree No.786----- 7
 → 8
 6

SECTION-13.2: HARVESTING AND DISPOSAL OF FOREST PRODUCES:

13.2.1. TIMBER AND FIREWOOD:

All coupes of main felling will either be worked departmentally or allotted to Forest Labourers Co-operative Societies (FLCS) or as per Government policy. All timber and firewood will be transported to the established Government depots or sanctioned depots by the competent authority for sale in open auction. The quantity of timber, poles and firewood to be given on nistar at concessional rates will be kept separately in these depots.

13.2.2 TENDU LEAVES:

Tendu Leaves collection, processing and disposal are governed under "Maharashtra Minor Forest Produce (Regulation of Trade) Act, 1969 (amended from time to time)." The trade in tendu leaves has been nationalized. The disposal of tendu leaves will be done in accordance with the provisions of this Act and Government Policy.

Branches below 23 cm in girth of tendu trees are permitted to be lopped. Also seedlings below 1.25 meter in height are permitted to be coppiced.

13.2.3. BAMBOO:

Bamboo will be harvested in accordance with the prescriptions laid down for Bamboo (Overlapping) working circle. Bamboo coupes may be allotted to the lease-holder or departmentally or both as per the Government policy in these regards. After harvesting, the bamboo will be brought to the Government depots or the depots sanctioned by the competent authority. The materials will be sold to Burads having nistar privileges or other people at concessional rates. Remaining bamboos will be sold in open auction. In the area where bamboo is available for harvesting but not included in Bamboo (overlapping) working circle, the Dy C.F Gadchiroli will prepare a scheme, and get it sanctioned from the Conservator of Forests and endorsed a copy to Working Plan Officer.

13.2.4. GRASSES:

Disposal of grasses from closed coupes will be done as per the instructions contained in the Panchayat Raj Extension in the Scheduled Areas and ownership of the minor forest produces vests with Panchayat Raj Institutions. If the concerned Grampanchayat or the other public bodies are not coming forward

to take this areas, then grass may be disposed off by either public auction or rated passes.

13.2.5. GUM:

Gum also comes under the category of minor forest produces. Their collection and disposal should be on the line of the Extension of Panchayat Raj to Scheduled Areas Act and or as per the understanding of JFM.

13.2.6. HONEY, WAX, BROOM GRASS:

These are also minor forest produces and are covered under the ownership of Panchayat Raj Institutions. Hence these produces will be disposed off as per the extension of Panchayat Raj to Scheduled Area Act or as per the involvement of Joint Forest Management Committees.

13.2.7. ALL OTHER MINOR FOREST PRODUCES:

The remaining minor forest produces will also be collected and disposed off as per the existing Government Policy in that regard.

13.2.8. GENERAL:

Sound and young growth of all important species yielding minor forest produces or medicinal plants such as *Mahua*, *Charoli*, *Hirda*, *Beheda*, *Aonla*, *Tendu leaves & fruits*, *Satawari*, *Kambarmodi*, *Safed Musli*, *Sarpgandha* etc should be retained in areas earmarked for harvesting in such a manner that they are suitably dispersed and would also serve as a subsidiary crop to main species and would constitute a source of availability of minor forest produce to the tribals and local people.

SECTION 13.3: IRREGULAR HARVESTING:

Irregular harvesting of timber, firewood and other minor forest produce is prohibited, except in the following cases.

- i) Removal of dead fallen timber and firewood and trees uprooted by wind or storm from all parts of the forests, except the coupes due for working, will be done in the following manner. Every year in the month of October each Beat Forest Guard will report compartment wise the availability of dead fallen firewood and trees uprooted by wind or storm to the concerned RFO. The RFO will then prepare compartment wise estimates for such material by marking these trees. Marking in a compartment will be done only if the number of such trees is more than 2 per ha as this much number will be required to be left in the forest to decay in order to benefit the wildlife in the forest. After the approval of estimates by the Deputy Conservator of Forests, harvesting will be done and the material will be taken out of the compartments. This material may be given to the Gram Panchayats or Forest Protection Committees at concessional rates approved by the Conservator of Forests. Further distribution will be done by the Gram Panchayat or Committees under the supervision of the concerned RFO. Where

there is no demand for this material, it will be brought to the sale depot and sold in open auction. The details of material obtained from each compartment, number of beneficiaries and revenue realized from it will be entered in the respective compartment history form.

- ii) Approval of felling of trees on fire lines will be given by the Dy. Conservator of Forests with reference to the Conservator of Forests.
- iii) Approval of felling of trees under electric and telephone lines existing prior to coming in force of Forest Conservation Act, 1980 may be given by the Deputy Conservator of Forests, as per the sanction accorded by the competent authority.
- iv) Felling of trees on forest land required by the other departments such as Irrigation, PWD etc for non Forestry Purposes will only be undertaken after the proposals for the use of forest land for non forestry purposes are approved by the Government of India under the provisions of Forest Conservation Act, 1980. The material obtained from such harvesting will be brought to the depots and will be disposed off along with regular coupe materials.
- v) The disposal of forest produce obtained from submergence areas of dams and tanks, from construction of roads etc will be carried out according to the orders, issued by the competent authority, in writing, in case of sanctioned projects.
- vi) No irregular harvesting for the purpose of undertaking plantations / afforestation work under schemes outside the scope of this working plan, will be taken up in any of the areas under this working plan.
- vii) The felling of trees for the purpose of growth study, preparation of volume table or yield table to be carried out by the working plan division will need no permission from Central Government, except giving the details of the plan of work to the territorial Conservator of Forests well in advance. Felling should be strictly as per the objectives of the work.

13.3.1. REMOVAL OF DEAD TREES:

Very often due to insect or fungus attack there is a large-scale mortality of pole and tree crops. Removal of such dead trees/pole crops will be permitted as part of irregular harvesting.

13.3.2. REMOVAL OF HIGH STUMPS:

The high stumps left over by the illicit cutters will be cut and flushed to the ground after duly verified by the ACF.

13.3.3. REMOVAL OF DANGEROUS TREES:

The trees leaning on the roadside or on the public or private property likely to cause injury / damage can be removed.

SECTION-13.4: MAINTENANCE OF BOUNDARIES:

13.4.1. In general the present state of forest boundaries and their maintenance is unsatisfactory in the tract. The boundary pillars of protected forests, New reserve forests formed during 1992 and boundaries of B-class reserved forests do not exist on ground due to improper and poor maintenance in most of the places. Hence the maintenance of boundary lines of these Forests is most important and to be taken on top priority by the territorial division to protect the forests from encroachment and illicit cutting. Under the survey and demarcation scheme, some of the areas of the ex-proprietary protected forests under the forest department have been surveyed and demarcated in the field. But afterwards no efforts were made to maintain the boundary lines and pillars and therefore, at many places forest areas have been encroached, and similarly a scheme of demarcating the ex-proprietary forests with TCM and pillars had been taken up on the basis of available records during 1987. But this could not be completed. Though the efforts are being taken to survey and demarcate these forests permanently, same is not in satisfactory pace due to paucity of staff in Land Record Department. Therefore, the Deputy Conservator of Forests, Gadchiroli will prepare a special scheme for five years to demarcate these areas. He will prepare the map showing the boundary pillar. One map should be supplied to the Conservator of Forests, Working Plan, Chandrapur-1 for his record and for showing the pillar numbers on the master set maintained in his office. This work should be taken as early as possible, latest in the very first year of the implementation of this working plan. Besides, the compartment boundaries of new RF, a 3-meter wide clear line should be made and maintained by cutting under growth regularly. The external boundary demarcation of the forests must be done by RCC pillars for reserved forests and protected forests as prescribed by the Principal Chief Conservator of Forests MS Nagpur vide his office letter No. CF/LR/68/2000-01 Nagpur dated 29th May 2001. The design of R.C.C. pillars for the survey and demarcation of the forestlands are uniformly designed throughout the state and has been approved by Principal Chief Conservator of Forests, M.S.Nagpur. The model estimates of R.C.C. pillars are given in Appendix No.LXVI of volume II.

13.4.2. Similarly, remaining Protected Forests also need be surveyed and demarcated on the ground so as to distinguish it from the revenue land. A special scheme should be prepared and the Deputy Conservator of Forests, Gadchiroli Division should launch a special program for immediate survey and demarcation of these areas. He will take drive for preparation of accurate maps for the same. This work can be done simultaneously while doing survey and demarcation of Reserved Forests.

13.4.3. The external and internal boundaries of the forest will be maintained according to 1/5 boundary demarcation and verification scheme. The Five year boundary demarcation and verification programme is

given in Appendix No.XLI of volume II. The boundaries of the forest will be maintained as given below:

- i) The width of the cleared area of the outer boundary of the Government forest will be 12 meters. The clearing will consist of cutting down all the undergrowth that impede the view, of one forest boundary mark from its neighboring one. Trees on the boundary line will not be cut down so long as they do not obscure the view of the boundary marks one from the other.
- ii) The specification about shape, descriptions, foundation, dimension, colour wash etc of boundary marks are given in the Principal Chief Conservator of Forest's letter dated 29/5/2001. The boundary pillars will be placed at visible distance one from the other, so that from any mark it's neighboring one on both sides can be seen clearly. Where there is no change in direction over a large distance, the boundary marks will be erected at intervals not greater than 200 meters. Each pillar will bear a serial number, a fresh series being given for each adjoining village.
- iii) In case RCC Pillars have not been erected, traditional cairns should maintained and if needed will be erected for proper control of boundary marks as per the norms given in Bombay Forest Manual.

13.4.4. BOUNDARY MARKS SPECIFICATION:

- i) The specifications of boundary will be as approved by the PCCF MS.
- ii) In addition to the boundary marks, tin plates will be fixed on the boundary trees at a height of 3m, preferably at the boundary of two compartments. These plates will indicate the compartment numbers with arrows and below them will be pillar numbers on either side of the plates. The metal plates will be of size 30 cms x 30 cms. They will be painted white and compartment number and boundary pillar number will be written in red.

13.4.5. While carrying out annual maintenance, the following points need special attention:

- i) That the pillars are correctly located as per map and demarcation register.
- ii) That the forest boundary is cut to the required width.
- iii) That the repairs to the cairn are done and the wooden post is replaced where necessary.

- iv) That the boundary posts bear the correct number and the same is engraved and written with coal tar or paint.
- v) That there are no encroachments. If there are any encroachments or are suspected, the matter should be pursued and the same should be removed.

13.4.6. RULES FOR INSPECTION AND MAINTENANCE OF FOREST BOUNDARY MARKS:

(i) The **forest guard** of the beat will be responsible for the maintenance and protection of all the boundary marks in the forests of his beat. He himself will colour wash them annually after rains and will make a special report of having performed this work. Each forest boundary mark in his beat will be specially inspected by the beat guard at least once in every year and a record of his inspection will be entered in his diary and will be submitted to RFO.

(ii) The **Round Officer** will be responsible for the maintenance and protection of all the boundary marks in the forests of his round. He will see that they are maintained properly, repaired and colour washed by the beat guard, as directed. The Round Officer will check all the boundary marks in a year, which come up for maintenance and repair as per the 1/5th boundary demarcation scheme. A mention of this will be made by him in his diaries. The Round Officer will annually submit to the Range Forest Officer a certificate in the following format:

"I, -----, Round officer, -----
----- certify that the annual length of boundary lines in my jurisdiction as prescribed under the scheme given in Appendix no...of the working plan for the forests of Gadchiroli division has been verified by me personally on __, __, __ and that boundary lines and marks and pillars are found to be correct as per the demarcation registers and maps. I, further, certify that next pillars (cairns) on either side of a pillar (cairn) are visible and they are in proper condition and bear correct serial number. There are no encroachments or encroachments are as detailed below".

Signature.
(Name & Designation).

(3) The Range Forest Officer will check at least 25% of the annual boundary lines as per the 1/5th boundary demarcation program and 5% verification will be carried out by the ACF.

13.4.7. MAINTENANCE OF COMPARTMENT BOUNDARIES:

The compartment boundaries will be cleared to a width of 3 meters, except where it runs along big nala, or road. Rectangular tin plates of size 30 cm x 30 cm will be fixed with nails on the trees at 3 meter height standing on the boundary of the compartment at regular intervals of 250 meters and also at all the corners. After painting the tin plates white, the compartment numbers will be written in red paint.

13.4.8. LEGAL PROVISIONS AVAILABLE FOR PROTECTION OF THE BOUNDARY MARKS:

Under section 63 (c) of the IFA, 1927 altering, moving, destroying or defacing any boundary marks of any forests to which the provisions of this Act apply, is punishable with imprisonment for a term which may extend up to two years, or with fine, or with both. This offence is non-compoundable under section 68 of the above Act. This legal provision should be made use of at all levels by the field staff. Strict watch will be kept on the persons who do so and they should be booked under the above provisions contained in IFA, 1927.

13.4.9. Area register will be maintained in the office of the Deputy Conservator of Forests Gadchiroli and will be updated every year after execution of survey and demarcation works described as above.

13.4.10. The Deputy Conservator of Forests Gadchiroli will supply a copy of the corrected maps and area register to the Conservator of Forests, Working Plan Chandrapur-1 every year in the month of June. The Deputy Conservator of Forests Gadchiroli will take all preventive and legal steps to prevent illegal activities.

SECTION 13.5: FIRE PROTECTION:

Fire is one of the major factors for non-establishment of natural regeneration and degradation of the forest in Gadchiroli Division. The operations prescribed in this plan can have beneficial effects only if rigid fire control is observed in the whole area in general and the worked areas annually in particular. The mere ritual of fire protection works cannot be of any help. This work can be entrusted to JFM committees on experimental basis. In case of success this practice can be implemented in other areas. For the purposes of fire protection the areas are classified as follows:

13.5.1. CLASS-I: COMPLETE PROTECTION AREAS:

The areas, which are included in complete protection areas from fire, are as follows:

- (i) All plantations of up to the age of 5 years,
- (ii) All main felling coupes of SCI, IWC, AWC, Silvi Pastural Working Circle, thinning coupes etc. are to be rigidly fire protected for a period of 5 years from the year of working.
- (iii) All roads passing through the forest (both sides)
- (iv) All Government depots including jungle depot, nistar depot and sale depot
- (v) Any other areas of special importance ordered by the Conservator of Forests

13.5.2. These areas will be protected completely from fire by cutting and burning of the fire line as per the standard procedure. Any kind of fire occurrence in these areas will be treated as a calamity and must be reported to the Dy. Conservator of Forests immediately, in writing, giving details of the area burnt and the extent of damage and quantum of losses.

13.5.3. CLASS-II: GENERAL PROTECTION AREAS:

The areas, which are included in **General protection areas** are the remaining areas of Selection-cum-Improvement Working Circle, Improvement Working Circle, Afforestation Working Circle.

13.5.4 All areas in this class will be isolated from the surrounding areas by means of external fire lines and will be divided into convenient blocks of internal fire lines. Firewatchers will be engaged for patrolling in these areas.

13.5.5. CLASS-III: PROTECTION OF FORESTS BY LAW:

The areas, which are included in **this category** are, all the forest areas that are not included in the above two classes. In these areas only deliberate burning is strictly prohibited under law. But no special measures are adopted to prevent fire in general.

13.5.6 The following lines will be maintained as fire lines and all the fire lines will be kept free from vegetation and combustible material during the fire season.

- (i) All external boundary lines of Reserved and Protected forests **to a width of 12 mt.**
- (ii) All the boundaries of regenerated areas including plantations up to 5 years from the year of planting to **a width of 6 mt.**
- (iii) All the coupes where regeneration works have not been carried out for period of 5 years starting from the year of main felling, **to a width of 3 mt.**
- (iv) **6 m. wide lines** on both sides of all roads and cart tracks passing through the forests.
- (v) **40 m. wide line** on all sides of the timber, bamboo and firewood depots.

13.5.7 LEGAL PROVISION AVAILABLE:

13.5.7.1 (I) PROVISIONS CONTAINED IN THE I.F.A., 1927:

The various legal provisions to protect the forest from fire are contained in the following sections of the Indian Forest Act, 1927. The following acts are prohibited under these sections in the Reserved Forest areas or in areas notified under section 4 of the I.F.A., 1927.

- (i) **Section 26(i)b** :- To set fire in reserved forests.
- (ii) **Section 26(i)(c)** :- Kindling, keeping and carrying any fire except in such seasons as the forest officer may notify in this behalf.
- (iii) **Section 26(i)(f)** :- Burning of any trees.
- (iv) **Section 26(i)(g)** :- Burning of lime-stone or charcoal.
- (v) **Section 26(3): -** The State Government may suspend the exercise of all rights of pasture or forest produce in the Reserved/ Protected Forests or a portion thereof whenever the fire is caused willfully or by gross negligence for such period as it thinks fit.

13.5.8. IN PROTECTED FORESTS PROVISIONS ARE AS FOLLOWS:

(vi) Any person who commits any of the following offences under section 33(i) (a),(b),(d) and (e) namely, burns any tree reserved under section 30, burns any lime or charcoal contrary to prohibition under section 30, sets fires to such forests or kindles a fire without taking all reasonable precautions to prevent its spreading on any tree reserved under section 30 and leaves burning in the vicinity of any such tree or closed portion under section 30, will be punishable with fine which may extend to two thousand rupees.

13.5.9. PROVISIONS CONTAINED IN THE MAHARASHTRA FOREST (PROTECTION OF FORESTS FROM FIRE) RULES, 1982:

The Government of Maharashtra, vide Notification No.1074\252\359\F-6, dated 14-10-1982 under section 32(6) and 76(i) (d) of the I.F.A., 1927 made the rules for the protection of protected forests from fire called "The Maharashtra Forest (Protection of Forest From Fire) Rules, 1982". The various provisions made under rules 3 to 7 are given as under.

Rule-3: A ban is placed on kindling fire within a distance of one Km. from the boundary of the forests.

Rule-4: Under this rule any person desirous of clearing by fire any standing forest or grass land beyond a distance of one Km. from the boundary of the forest will observe the following rules:

- (i) He will clear a fire belt at least 10 mt. wide on the side of the area which he proposes to burn which is nearest to the boundary of the forest in such a manner that no fire can spread across such belt.
- (ii) He should keep a firewatcher to see that the fire does not spread in the forest area.

Rule-5: Under this rule any person desirous of burning "Rab" or clearing land by burning the growth on it near the forest boundary, should inform the nearest forest officer at least one week in advance of his intention to do so. A clean belt of at least 10 mt. width should be left in between the boundary of the forest and the place where the rab is to be burnt so that the fire does not spread in the forest and while burning the rab he should make such arrangements so that the fire does not spread in the forest area.

Rule-6: Under this rule any person collecting inflammable forest produce such as grass, firewood, leaves, bamboo on land adjoining the forest land, and holder of a permit to collect such produce from the forest area, will stack it in an open space at such reasonable distance from the forest as the Dy. Conservator of Forests may by general or special orders prescribe, and will isolate the stacks in such a manner that if they catch fire the fire will not be able to spread to the surrounding areas to cause damage to the forests.

Rule-7: Under this rule all camping places along the boundary of and within the limits of the forest area will be cleared and will be set apart by the Dy. Conservator of Forests for the use of visitors. A list of all such camping places will be published annually and except on such camping grounds no fire will be lighted within or along the boundary of the forest. All persons using these camping grounds will light fire for cooking or other purposes in such a way so as not to cause damage to the forests or any buildings, sheds or other property on the camping grounds and before leaving they will collect all the inflammable materials from the camping sites and will carefully extinguish all of them.

Rule-8: Rules 3 to 7 will be relaxed during the rainy season from 15th of June to 31st of October.

13.5.10 II) PROVISIONS CONTAINED IN THE BOMBAY FOREST MANNUAL VOL-II PART- IV:

Following provisions are made in this manual.

Rule -152: As per this rule the forest fire cases should not be compounded.

Rule-153: It deals with the duties of the Magistrates dealing with forest fire offence cases.

Rule-157: It provides for the continuous protection of the valuable forests from fires.

Rule-158: Under the provisions contained in this rule, if the forest fire is serious and due to repeated neglect by the villagers, then as an exception a communal punishment can be given with the sanction of the Government.

Rule-159: It deals with the duties of the villagers.

Rule-160: It deals with the powers of the forest officers to sanction reward in cases of effective fire protection.

Rule- 162: It deals with the powers of the Commissioner to sanction rewards to the villagers for effective fire protection.

13.5.11. (III) PROVISION FOR FIRE PROTECTION CONTAINED IN THE WILDLIFE (PROTECTION) ACT, 1972:

Following provisions are made to control the forest fire in this Act.

Section 17(i)(e): Under this section setting fire to any vegetation for hunting purposes is prohibited.

Section 27(2) (d) & (e): Every persons will as long as resides within the sanctuary, is bound to extinguish any fire in such sanctuary of which he has knowledge or information and also he will help the forest officer in extinguishing the fire.

Section-30: Setting fire in sanctuary, or kindling any fire or to leave any fire burning, in a sanctuary by any person so as to endanger such sanctuary, is prohibited.

Section-32: Use of explosives, any chemicals or other substance in the sanctuary by any person which may cause injury or endanger any wildlife is prohibited.

13.5.12. (IV) PROVISIONS CONTAINED IN THE MAHARASHTRA MINOR FOREST PRODUCE (REGULATION OF TRADE) ACT, 1969:

As per condition No. XII of terms and conditions of the contract for tendu for 2003, the Licensee, his representatives and munshis and labourers employed by him for collecting tendu leaves will be bound to assist in putting off any forest fire and to give information of any forest fire in their knowledge or vision to the nearest forest or police officer. The Licensee will be held responsible for any fires deliberate or accidental occurring in his Unit\Group of Units or in its close proximity during the above period for which he will be liable for penal action.

13.5.13 (V) PROVISIONS CONTAINED IN "THE MAHARASHTRA FELLING OF TREE (REGULATION) ACT, 1964:

As per section 2(e) of the above Act burning of trees on private land is included in the definition of "Felling of trees" and such act without obtaining felling permission from the competent authority of the Revenue Department under section 3, is punishable under section 4 of the above Act. The punishment may be given by the competent Revenue officer may extend upto Rs.1000/-. Besides, the tree so felled is also liable to be forfeited to the Government. As per the amendment to this Act, in 1989 "Tree Officer", who is an officer not below the rank of the R.F.O, has replaced the word Revenue Officer. The Dy. C.F. should get translate these provisions/Rules in Marathi or vernacular language and printed copy, be supplied to Gram Panchayat annually, well before fire season, and request should be made for assistance to control forest fire. The number of trees illicitly felled in malki khasara (adivasi and non-adivasi) are given in Appendix No.LVII of volume II.

13.5.14 STEPS FOR EFFECTIVE FIRE CONTROL

A. CUTTING AND BURNING OF FIRE LINES:

- (i) The cutting of the lines will be completed **by the end of December** and burning will be completed before the **end of February**.
- (ii) Dry leaves and other dry materials on fire lines will be collected from time to time and stacked along the edge of fire lines and burnt before the fire season starts.
- (iii) Except with the permission of the Dy. Conservator of Forests, no fire lines will be burnt after February. If such permission is granted, the burning should be done in presence of R.F.O.
- (iv) Modern fire fighting tools will be used for extinguishing the fire.

The list of fire lines in Gadchiroli Division, are given Appendix No. XLIX of volume II.

13.5.15. B. DEPLOYMENT OF FIRE WATCHERS AND STAFF:

- (i) There are number of reasons for intentional or accidental forest fire but the persons involved in kindling of fire are the local villagers only. Therefore it is very much essential to have a open dialogue with the villagers and they should be made aware of the disastrous effect of forest fire. The sensitive areas around each village are to be identified and a gang of firewatchers of that village should be employed who will have the sole responsibility of fire protection of the area.
- (ii) Before the fire season starts, a scheme will be prepared in which the strategic locations will be marked on a map at which gangs of fire watchers of 5 to 10 will be kept, who will supervise the area around that point and can reach the spot when fire is noticed. Daily reports from the firewatchers should be called for.
- (iii) The staff associated with the fire protection work will monitor the work of firewatchers and will coordinate the working of different gangs located at different locations.
- (iv) The available vehicles will be deployed at strategic locations, which can be approached by any gang, in case of emergency. These vehicles will be equipped with fire fighting labourers, water and other equipment required for extinguishing fire.
- (v) The regeneration area of SCI. IWC and AWC will require special efforts. For this, the area will be divided into blocks of 5 to 10 ha. For each block, one labourer will be kept whose main job will be to protect the block from fire and grazing. In addition, he will do the work of cleaning, weeding and singling of seedlings.

(vi) Utmost care will be taken to extinguish the fire and to quench the smoldering material absolutely. Filling earth over such material will be found very effective. No official will leave the burnt locality till the senior most forest officer present on the spot directs them to leave after ascertaining and satisfying himself that no smoldering material is left.

(vii) The financial loss due to fire will be communicated to the Accountant General without any delay as per Appendix-19 of Rule 148 of Bombay Financial Rules, 1959 and B.F.M. Vol.-I, Rule 369.

13.5.16 *RESPONSIBILITY:*

The Range Forest Officer will be personally responsible for the efficient protection of fire in each range. The responsibility will be fixed on the merits of each case and after due inquiry by the Deputy Conservator of Forests or an officer appointed by him for the purpose.

The Dy. Conservator of Forest will be personally responsible for carrying out fire protection measures efficiently (as envisaged under various Acts and rules and regulations made there under) in the area of his Division.

The Dy. Conservator of Forest must satisfy himself that the exterior fire lines and other fire lines have been properly cleared and burnt thoroughly before the **end of February**. He must make frequent visits to the areas, where the incidents of fire are common. He must during his tour satisfy himself by constant enquires and inspections that no fire anywhere in the forest areas have gone unreported and that the reported areas of fire have been accurately estimated. These checks require extensive and thorough personal inspection by him. A strict watch should be kept on Tendu Leaves Contractor and their agents who engage the local people to set fire in the forest floor in order to get good flush of tendu leaves. These fires are generally made between 1st of March and 15th of April each year.

13.5.17 *FIRE REPORTS:*

All the fire reports will be communicated to the Dy. Conservator of Forests with details of extent of area of fire, damage caused, amount of loss and cause of the fire etc. without any delay. Enough communication networks have been established for this purpose.

The Range Forest Officer, will report immediately the outbreak of fire in his area to the Dy. Conservator of Forests. The R.F.O. maintain proper communication and coordination with field staff so that no delay occurs in receiving the fire report. After the fire is extinguished, a detailed final report covering the area burnt and other details along with a sketch map will be submitted by the R.F.O. to the Dy. Conservator of Forests within 15 days after thorough inspection of the burnt area by himself.

The Dy. Conservator of Forests will submit monthly return in prescribed proforma to the Conservator of Forests showing therein the serial

number of fire incidence, date of occurrence and offence recorded, cause of fire, area burnt, extent of damage and amount of loss, measures taken to extinguish fire etc. All records of fire will be shown on maps of scale 1"=2 mile and the record of fire will be filled in the concerned compartment history and the map will be attached to it. This record will be maintained both at Range and Division level.

Areas deliberately burnt for silvicultural purposes e.g. to destroy felling debris or to stimulate reproduction will be excluded from the scheme of fire protection. Such fire will not reported unless they spread into a protected area. Deliberate burning is only permissible if prescribed in the working plan or sanctioned by the Conservator of Forests.

The steps to cut back badly damaged young regeneration in the naturally and artificially regenerated areas due to fires, will be undertaken by the R.F.O. in consultation with the Dy. Conservator of Forests.

SECTION 13.6: GRAZING CONTROL:

13.6.1 The success of regeneration will depend upon the effective control on grazing and protection from fire. The cattle population in the villages around the forest areas is very large and they are directly dependant on forests for their fodder requirement. The number of cattle found in Gadchiroli Division are given in Appendix No.LXI of volume II. This resulted in heavy and unregulated grazing due to which the soil is highly compacted and regeneration of the crop is also adversely affected. These needs effective implementations of the grazing policy of the Government of Maharashtra vide its resolution No. MFP-1385/132211-Y dated 8-12-1968 and also the provisions made in the Bombay Forest Manual Vol.II, Part VI will be thoroughly implemented and the coupes worked will be closed for grazing up to 10 years or more till the establishment of regeneration.

Keeping in view the above provisions the grazing in various working circles of this plan will be regulated as under.

13.6.1.2.SELLECTION-CUM-IMPROVEMENT WORKING CIRCLE:

This working circle comprises of the good quality tree forests and here the maximum incidence of grazing takes place. The grazing area is required for a unit of cattle are 1.2 ha. All main felling coupes will remain closed for grazing for a minimum of 5 years period from the year of main felling. Thus with a felling cycle of 20 years, 1/4th area will remain closed for grazing at any time after 5 years from the commencement of this plan. The average carrying capacity for this working circle will be 123496 cattle units.

13.6.1.3. II. AFFORESTATION WORKING CIRCLE:

This working circle comprises of minor and degraded forest and the maximum incidence of grazing prescribed for it is 0.8 ha. per cattle unit. All main felling coupes will remain closed to grazing for 5 years from the year of main felling. Thus with a felling cycle of 20 years, 1/4th area will remain closed to grazing at any time after 5 years from the commencement of this plan. The average carrying capacity will be 41380 cattle units.

Thus as per the prescriptions of the working plan 164876 cattle units can graze in the forest area at any time. The remaining cattle can be accommodated in the community lands of the villages where fodder development works can be taken with the help of Social Forestry Department, Village Panchayat, Forest Protection Committee or voluntary agencies. At the same time the villagers will be persuaded to stall feed their cattle, the grass for which will be allowed to be removed from the closed coupes or old plantations. They will be made aware of the ill effects of excessive grazing in the forests. The Dy. Conservator of Forests should think for rotational grazing in areas, which are not due for working. The experiment of silage preparation should be conducted and through this stall-feeding should be advocated. The preparation of silage will solve the problem completely. People should be motivated to keep productive cattle only in small numbers for better returns.

Grazing rules made applicable vide Govt. of Maharashtra Revenue and Forest Department Resolution No.MFP-1371/237035-Z, dated 3rd November 1973 will be strictly followed which has been given in the Appendix No. XLVII of Volume II.

SECTION- 13.7: ENCROACHMENTS:

13.7.1 The problem of encroachments around the villages is prominent. Improper demarcation and poor maintenance of the boundaries between Revenue and Forestlands is one of the main reasons of encroachments. A special scheme is required to be launched to demarcate protected and reserved forest properly. The maintenance of the boundaries should be emphasized. The beat guards will be provided beat maps along with the instructions in vernacular language. Records of encroachment will be made compartment wise in the compartment history form and will be shown on the map also.

The encroachment on forestland for cultivation purpose between 1972-78 is to be regularized by the Government vide two resolutions R & F D, LEN-1078/3483-G-I. Dated 27th December 1978 and R & F.D.-FLD-1079/1366/F-3 dated 12th September 1979. The present Government policy is very clear vide two resolutions R. & F.D. No. FLD-1078/144074/F-3 dated 5th March 1980 by which any illegal construction of hut on the forestland should be removed immediately and FLD-1087/PK-397/F-3 dated 14th July 1987 stating that encroachment not likely to be regularized and taken place after 31st March 1978 should summarily be removed. There is a need for stringent measures against the encroachers.

Encroachment status

S.No	Period	No. of encroachers	Area under encroachment (in ha.)
1	Upto 1978	979	1167.43
2	After 1978	1452	1510.51
Total for division		2431	2677.94

SECTION 13.8: ILLICIT CUTTING:

13.8.1 There is no problem of large scale organized illicit cutting in this division but due to heavy demand of firewood, poles, and small timber by the local villagers adjoining to the forests has put tremendous pressure on these forests. This has resulted in deterioration of forests adjoining to the villages. For

effective control on illicit cutting, special protection camps, each camp consisting of 3 foresters, 12 guards and 6 labourers at strategic points with a vehicle are proposed.

The Government vide letter No.1087/102380/F-2, R & F.D. dated 18th June 1981 has stated that all illicit cutting value of Rs. 25,000/- and above at a place should be reported to the Government, the Chief Conservator of Forests and the Conservator of Forests by the Dy. Conservator of Forests, within 3 days of the receipt of the report of the R.F.O.

SECTION 13.9: BUILDINGS:

13.9.1 The existing offices and residential buildings are not sufficient for the staff; especially for the field staff at range, round and beat level. Non-availability of accommodation in the interior areas of the forest adversely affects the forest protection works. It is, therefore, suggested that, wherever there is no forest guard's and round officer's quarters, the same should be constructed on priority basis. Special repairing works will be taken up to all the existing residential quarters, which are quite old to make them suitable for living. All the existing buildings should be maintained in good condition. Sufficient funds should be made available for repairs and maintenance of the existing buildings. The list of existing buildings in Gadchiroli Division are given in Appendix No. X of Volume II.

13.9.2 There are only a few rest houses and inspection huts exists in Gadchiroli Division. All these existing inspection huts need proper maintenance and facilities for the touring officials of the forest department during the inspections. The list of Rest houses / Inspection huts in Gadchiroli Division are given in Appendix No.LIV of Volume II.

SECTION- 13.10: ROADS, CART TRACKS AND CULVERTS:

13.10.1 The forest area of Gadchiroli Forest Division is well connected by roads and cart tracks. Gadchiroli – Wadsa, Gadchiroli - Sindewahi, Gadchiroli - Chandrapur via Mul, Gadchiroli - Nagpur via Naghbhid are the main lines of road transport. Besides, there are feeder roads like Gadchiroli – Chatgaon, Gadchiroli – Potegaon, etc. Within the forest areas many cart tracks exist. Many of the roads have been taken over by P.W.D. or by Zilla Parishad for maintenance. A proper record of these roads will be maintained by the Territorial DY.C.F. The P.W.D. or Zilla Parishad should also be informed, in writing, that which of the roads passing through the forests are handed over to them permanently and which of the roads are handed over for maintenance only. The other roads and cart tracks will be maintained departmentally. Priority for maintenance will be decided depending upon the availability of funds. Top priority will be given to those roads, which are important from protection point of view, exploitation and transportation of the forest produce. The list of existing Forest Roads in Gadchiroli Forest Division has been given in the Appendix No. IX of Volume II.

13.10.2 Construction of bridges across Wainganga and her tributaries have tremendously improved the line of road communication. The forest roads generally pass through the boundaries of the compartments. On the fringes of the forest, generally exist small patches of forestland in between the road and the forest boundary. At many places it is observed that these patches between the

forest roads and boundary line are neglected and in case of private lands adjoining the forest, there is every possibility that these patches may be encroached by the adjoining cultivators. In future such land may be permanently lost. This point also needs to be kept in mind at the time of 1/5th boundary demarcation. Culverts are required to be constructed on some nalas to make the roads all weather road.

SECTION 13.11: WATER SUPPLY:

13.11.1 Water scarcity is felt during summer in the year, in which rainfall is scanty. At some places shortage of drinking water is also felt. Proper implementation of soil and water conservation works can minimize the problem of water shortage. Deepening of the existing wells and creating tube wells in the forests nurseries/colonys is to be taken up on priority basis. List of existing wells in Gadchiroli Division has been given in Appendix No.IV of Volume II. Water harvesting technology is to be given due importance in all the places of water shortage. Special programs of construction of water harvesting structures shall be taken up under FDA/JFM schemes.

SECTION-13.12:PRIVILEGES AND CONCESSIONS FOR FOREST PRODUCE:

13.12.1 As per the Forest Policy of 1988, the first charge on the forest produce is that of tribals and other villagers living in and around the forest areas. Accordingly, the forest produce obtained from the forests will first be supplied to the local people as per their requirement at the rate fixed by the Collector of the district. The necessary proposals to fix the nistar rates for fuel wood, poles, and bamboo will be prepared and sent to the Collector, for sanction annually. However, before sending such a proposal, the matter will be discussed with the Conservator of forests concerned. The arrangement for supply of material will be made at coupe depots in case of fuel wood below 30 cms. girth so as to reduce the transportation costs on firewood. However, the poles and bamboo will be supplied from the sanctioned nistar depots. A special duty forester may be deputed for the purpose of issuing money receipts and remittance of the money collected.

SECTION –13.13: BAMBOO:

13.13.1. Bamboo is said to be “poor man’s timber” and therefore bamboo plantations must be encouraged all over the division wherever possible and the produce obtained from such areas should be made available to the local people, burads and other cottage industries.

13.13.2. In Gadchiroli District there are lot of Burads who prepare bamboo mats and other bamboo articles to earn their livelihood. Bamboos are required by agriculturists also. Their requirements are fulfilled through departmental working of nistar coupes.

SECTION –13.14: SMALL TIMBER, POLES AND FIREWOOD

13.14.1. Small timber and poles for agricultural purposes and repairs to houses and firewood for domestic use will be supplied from the depots at

concessional rates, depending upon the availability of these produce. Nistar depots will be opened at suitable places, throughout the division, so that people need not go to distant places to procure these produce. Range, Round or Beat head quarters will be chosen for this purpose, so that supervision and maintenance of these depots becomes convenient.

13.14.2 REMOVAL OF EDIBLE FLOWERS, FRUITS AND SEEDS AND OTHER MINOR FOREST PRODUCE:

Collection of Moha flowers and seeds, Charoli, Tendu fruits, Bor and other minor forest produce may be allowed freely for tribal and local villagers for their bonafide use. However, no forest produce will be allowed to be removed free, for commercial purposes. During collection of any forest produce, no felling or hacking of trees will be allowed.

SECTION-13.15: SURVEY AND MAPS

13.15.1 Reserved forests of Gadchiroli Forest Division have been surveyed on 4"=1 mile scale. The newly Reserved Forest and Protected forest have not been surveyed by Survey of India. All these forests have been stock mapped on 1:15840 topo sheets in the past. The Stock Maps will be prepared in GIS cell at Nagpur on the basis of Satellite maps under the Administrative control of Chief Conservator of Forest, Working Plan Circle, Nagpur. As per the instructions contained in standing order No. 55 of Chief Conservator of Forests, Working Plans, the following sets of maps will be prepared.

13.15.2 DIVISIONAL MAPS:

These are to be prepared on 4"=1 mile or 1:15840 sheets. However, whole area has not been surveyed by Survey of India on 4"-1 mile scale. The maps available on this scale have been obtained by reducing the village maps, which are not so accurate.

13.15.3. (A) .FOR C.F. WORKING PLAN:

Two uncut and mounted sets called "Master sets" will be prepared having following details.

- (i) One fair set indicating stocking details.
- (ii) One management map showing compartments, coupes, felling series, working circles, range boundaries and other management details.

13.15.4 (B). FOR DY.C.F. GADCHIROLI:

One uncut and mounted and two cut and mounted sets showing the management details will be supplied to the Dy. C.F., Gadchiroli. One copy of the cut and mounted set will be for the use of the DY.C.F. and the divisional Surveyors and the second cut and mounted set will be given to the concerned R.F.O.

13.15.5 MANAGEMENT MAPS FOR TERRITORIAL CONSERVATOR OF FORESTS & THE CHIEF CONSERVATOR OF FORESTS, WORKING PLANS:

Two sets of maps on 1:50000 will be prepared, one copy each for the territorial Conservator and the Chief Conservator of Forests, Working Plans. These maps will show all the management details viz. compartments, working circles, felling series, range boundaries and other administrative details.

13.15.6 REFERENCE MAP:

A small reference map on 1:2,50,000 scale showing range boundaries, compartments, working circles, felling series, roads etc. have been prepared and attached to each copy of the working plan.

13.15.7 GRAZING MAP:

Two sets of maps on 1:2,50,000 scale showing grazing series have been prepared. One set will be kept in the office of Conservator of Forests Working Plan office and the other set will be supplied to the DY. Conservator of Forests, Gadchiroli.

13.15.8. Maintenance of Land Records - The land records will be maintained in the proforma prescribed by Land Cell in the office of PCCF M.S. Nagpur.

13.15.9. Mutation of Land records – Mutation entries in favour of forest department will be done in the 7/12 extracts, where it is not done earlier. This will prevent any unlawful diversion of forestland. In each 7/12, the following entries will be recorded (in Seven) Govt of Maharashtra, Forest Department, Reserved/Protected Forest. The above entries will be in a manuscript and no stamps should be used to show these descriptions. The final forest area data as per the categories of forests, in the tract will be provided to Conservator of Forests Working Plan-1, Chandrapur.

SECTION- 13.16: ARTIFICIAL REGENERATION:

13.16.1: PLANTING OF TEAK AND MISCELLANEOUS SPECIES:

13.16.1.1: In the areas suitable for planting teak and miscellaneous species, planting will be done in the year following the year of main felling. In Teak planting areas, Teak stumps will be used and in other areas, miscellaneous species will be planted through polythene bags. The details of various works will be as follows:-

13.16.1.2: PREMONSOON WORKS:

They will be carried out in the year of main felling along with the felling. They will include following works.

13.16.1.3: FENCING:

The whole coupe will be taken for fencing. TCM of standard cross section of 1.90 m x 0.60 m x 1.0 m will be dug where the boundary runs along the

contour. No TCM will be dug when the boundary of the coupe runs across the contour or inside the compartment. In that case, live-hedge fencing will be taken. Live hedge fencing will consist of two outer rows of agaves 50 cm apart and 3 inner rows, 50 cm apart, on which sowing of seeds of fast growing thorny trees like *Acacia Senegal*, babul etc and planting of cutting of shrubs like Vitex, Dodonea etc will be done after the monsoon.

13.16.1.4: DIGGING OF PITS:

For planting of miscellaneous species pits of size 30 cm x 30 cm x 30 cm will be dug. The dug up soil will be kept on the upper side of the slope. The digging of pits will be completed up to March and the soil will be allowed to weather during summer. Filling of pits will be done at the end of May. The number of plants of teak and miscellaneous species will be 2500/ha.

13.16.1.5: NURSERY:

(i) **TEAK:** Teak stumps will be prepared from one year old seedlings raised in the beds as per standard nursery technique. The source of seed must be from known source and certified by the competent authority. The stumps should not be below thumb thickness.

(ii) **MISCELLANEOUS PLANTS:** The miscellaneous plants will be raised in the polythene bags. The standard size of the polybag plants suitable for planting will be when the collar of the plant is approximately thumb thick and is woody in appearance. The height of the plants will vary from species to species. To achieve the optimum sized polybag plants, the nursery work will be started latest by October in the previous year of planting. The polythene bags, in which after sowing of seeds of desired species will be properly watered and will be shifted every 15 days, once the height of plants reaches 10 cm. Care will be taken that each bag contains only one seedling. During the shifting the bags will be arranged in descending order of plant heights. Suitable fertilizer and manure will be given to the plants at regular intervals. Before planting, the planting stock will be examined by an ACF and he will certify the suitability of the planting stock.

13.16.1.6: FIRST YEAR OPERATIONS: As soon as the monsoon starts, seed sowing in 3 rows for live hedge fencing, described earlier, will be done by raking the soil along the line 10 cm deep. Planting of agave on the outer two rows of live hedge fencing at a spacing of 50 cm and planting of shrub cutting on the inner 3 rows, will be done. Teak stump planting in crow bar holes and polybag planting in pits will also be done along with the planting on live hedge. The polythene bags will be planted in such a manner that their collars are at the ground level and it will be covered with soil up to a height of 5 cm above collar. All these operations will be completed in not more than 15 days after the break of monsoon.

13.16.1.7: SUBSEQUENT OPERATIONS: Immediately after the completion of planting, first weeding will be started. Casualty replacement will be done along with the first weeding. Second and third weeding will be done in the month of September and October respectively. The last weeding will include soil working and mulching to reduce the evaporation losses. One more soil working may be

done in the month of January, if there are winter rains, subject to the availability of funds. Weeding and soil working to the seedlings on live hedge will also be done in order to enhance their growth and survival.

13.16.1.8: In the second year of plantation, casualty replacement will be completed soon after the onset of monsoon. Two weedings will be carried out in the month of August and October respectively. Soil mulching will be carried out at the time of second weeding De-budding of teak plants will be done in the month of April/May.

13.16.1.9: In the third year one weeding with soil mulching will be carried out in the month of September. De- budding will be done as in second year.

13.16.2. BAMBOO PLANTING:

13.16.2.1: Bamboo will be planted, at a spacing of 6m x 6m, in the fourth year from the year of main felling or in other suitable areas as under planting. The details of various works will be as follows:

13.16.2.2:PRE-MONSOON WORKS:

They will be taken in the third year from the year of main felling. Pits of size 45 cm x 45 cm x 45 cm will be dug before March. The dug up soil will be kept on the upper side of the slope. The pits will be refilled in the following year before the onset of monsoon.

13.16.2.3: NURSERY: Two years old bamboo seedlings with well-developed rhizomes will be used for planting. The best method for preparing the good seedlings will be by establishing rhizomes bank at suitable sites in each range. Bamboo seeds from known source will be sown in beds of size 12 m x 1.2 m x 0.3 m, two years in advance of planting. In the month of February and March the seedlings from the beds will be transplanted into polythene bags after cutting their branches above 3 to 4 nodes. They will sprout within 15 to 20 days. After sprouting, suitable fertilizers will be given to get vigorous growth.

13.16.2.4: FIRST YEAR OPERATION: At the onset of the monsoon, the polypots seedlings will be transported to the planting sites and will be planted in pits. At the time of planting, suitable fertilizers and insecticides will be given to each plant in the pits Casualty replacement will be done at the end of July or in the first week of August, Three weedings and soil working will be done.

13.16.2.5: SUBSEQUENT OPERATIONS: Casualty replacement and two weedings with soil working will be done in the second year. One weeding and soil working will be done in the third year Insecticides will be used if there is termite attack

SECTION- 13.17:SOIL AND MOISTURE CONSERVATION WORKS:

13.17.1 With the increase of biotic pressure, the forest areas near villages in Gadchiroli Division are becoming degraded. As a result of this the forest floor is completely exposed to sun and rain and thus becoming vulnerable to erosion. Due

to great impact of rainfall, the run off of the forest floor increases. The rainwater washes off the exposed top fertile layer of the soil due to which the percolation and water holding capacity of the soil increases. Hence adequate soil and moisture conservation works should be taken up to improve water table and also to prevent soil erosion. The soil and moisture conservation works includes forest tanks, check dams, nala bunds, brush wood dams, contour trenching etc. These SMC works should be carried out from ridge to valley. The list of tanks in Gadchiroli Division are given in Appendix No. L of volume II.

13.17.2: CONTOUR TRENCHING:

If necessary continuous contour trenches will be taken all over the coupe, due for working, where the density of the crop is below 0.4. The cross section of the trenches will be 45 cm x 30 cm. The soil from the trenches will be heaped on the lower side of the trenches. The boulders from the trenches will also be neatly stacked on the lower side. Grass tussocks planting, sowing of seeds of grasses and local tree and shrub species and planting of cuttings of Vitex, Dodonea, ipomea and bulbils of agave will be done on the heaps of the soil for its stabilisation. The contour interval between the consecutive trenches will be 1.5 m. Depending upon the slope, the distance between the two consecutive trenches will vary. In order to bring the uniformity in working the distance between consecutive trenches is given in Table below:

13.17.3: However, the actual spacing is to be determined after getting treatment map and doing the following calculations.

If a = Average annual rainfall in mm in a year
 b = Rainy days in a year
 c = $\frac{a}{b}$, the average rainfall per rainy day in mm
 then d = 10 c, is the rain fall in cubic meter/rainy day/hectare.

For the trench of size = 0.60m x 0.30m x 1m = 0.18 m³, the length of the trench in meter per hectare required to absorb water pouring per rainy day per hectare completely can be calculated as follows:

$L = d/0.18$ in m. and accordingly the distance between two consecutive lines can be determined. Taking an example of one hectare the distance between two consecutive trenches come to be 10,000/L in meter

Slope in degree	Distance between consecutive trenches
Upto 15	8 m
15 to 25	5 m
Above 25	3 m

13.17.4: The trenches near the nalas will be discontinued and will be curved upwards, on both sides of the nala, at an angle of 45 degree. This will prevent the run off of water, stored in the trenches, into the nala. The curved portion will be of 5 m length on either side of the nala. The alignment of contour trenches may be done by a simple frame called “A” frame made of bamboo.

13.17.5 NALA BUNDING / CHECK DAMS:

The basic aim of nala bunds or check dams will be to reduce the run-off of water and to arrest the silt. Nala bunding will start from the top of nala downwards. Nala bunds/check dams will be prepared from the loose boulders found in or around the nala bed. No digging or blasting will be done. Where sufficient boulders are not available brushwood can also be used. Nala bunds will be prepared on nalas up to 8 m bed width. Beyond that these structures will not be useful and permanent engineering structures will be required. These structures are not being prescribed here. For the design of nala bunds, the nalas have been divided into three categories, namely (i) up to 4 m bed width (ii) between 4 m to 6 m bed width and (iii) between 6 m to 8 m bed width. The design of nala bund must be approved by the Forest Engineer. The designs and details of nala bunds are given in Appendix No.XLIII of volume II. Nala bunds should be started from one side of the bed. Semi circular boulder pitching should be done on the top of the bunds, so that the stones are compact and are not washed away by water. The batter on upstream and downstream should be 2/1 and 1/1 respectively. The distance between the successive bunds will be such that standing on the site of lower bund the base of upper bund should be in line of eyesight of the person, standing on the nala. For general guideline the distance between successive bunds for different slopes will be same as that for contour trenches.

SECTION- 13.18 SAW MILLS:

13.18.1. There are three saw mills operating in the tract. The details of Saw mills are given in the Appendix No.LIV of volume II.

13.18.2. Saw Mills are controlled by Rule No-88 under Bombay Forest Rules, 1942 amended from time to time and made applicable for whole Maharashtra.

SECTION-13.19 CHARCOAL KILNS:

13.19.1: No permission to manufacture charcoal to the private person will be given in the Reserved or Protected Forests or in private areas up to 1 km from the boundaries of the forests.

SECTION- 13.20: USE OF HAMMERS:

13.20.1: The territorial Conservator of Forests will issue guidelines and circulars regarding the shape and size of various types of hammers, which will be used for the following works:

- (i) Hammers for marking of coupes.
- (ii) Hammers for POR material to be marked by Forest Guard.

- (iii) Hammers for POR material to be marked by Foresters/Round Officers.
- (iv) Hammers for POR material to be marked by Range Forest Officers.
- (v) Hammers for POR material to be marked by Asstt Conservator of Forests.
- (vi) Passing Hammers for transport of materials from Jungle Depot to Coupe Depot.
- (vii) Passing Hammers for transport of materials from coupe depot to sale depot.
- (viii) Passing Hammers for transport of sold material.
- (ix) Hammers for marking of malki materials/ timbers by ACF.
- (x) Passing Hammers for transport of malki materials.

SECTION-13.21: SCHEDULE OF RATES FOR OFFENCE CASE MATERIALS:

13.21.1: The Conservator of Forest (Territorial) will in the beginning of the calendar year circulate the schedule of rates for offence cases material to all the Deputy Conservator of Forests (Territorial) in his circle.

SECTION – 13.22 : DEVIATIONS:

13.22.1 (1) The following works will not be constituted as deviation from the plan :-

- (i) Removal of dead fallen firewood.
- (ii) Petty felling carried out as mentioned in para under irregular harvesting.

(2) The following works will constitute a deviation from the working plan:-

- (i) The felling and disposal of forest produce from submergence areas of dams, tanks, canal sites, road sides and other cases coming under the purview of the Forest Conservation Act, 1980. The sanction to it will be obtained.
- (ii) All other deviations can be classified into following two categories as per draft amendment to article 191 and 192 of working plan code vide Agriculture and Forest Department Govt. Resolution NO. FWP 1062/5625(II)-J, dated 25-5-1962.

(A) Deviation which would seek to alter the schedule of working given in the working plan the examples of which are

- (i) Both non-working of a coupe in the prescribed year or working the coupe in the year not prescribed by the plan.

- (iii) Changes in the areas of coupe on account of disforestation or undertaking areas for execution of any special scheme under plan programme and

(B) Deviations, which would involve alternation in the silvicultural treatment, for example

- (i) Stopping or curtailing fellings for planting because of shortage of labour, fund, material for plantation work, or unsuitability of terrain and soil for undertaking plantations to the extent prescribed by the working plan.
- (ii) Extensive felling of dry trees killed by fire, fungus, insect attack or other natural calamities departmental works.
- (iii) Felling of unusual size and extent for special departmental works.
- (iv) Felling involving modifications in the prescribed marking rules.

13.22.2. The sanction to all these deviations will be obtained. Application for sanction to such deviation will be submitted sufficiently in advance, so that such may be received as far as possible before the deviation occurs and without fail before the annual list of deviation is submitted along with the control forms.

13.22.3. *PROCEDURE FOR OBTAINING SANCTION FOR DEVIATION:* All deviation proposals require the approval of the Inspector General of Forests as per instructions contained in Govt. of India, Ministry of Agriculture No. 6-14/84/FRY/(W.P), dated 23-8-1984.

13.22.4. The DY.C.F. (Territorial) will submit 8 copies of the deviation proposals to the Conservator of Forests through the DY.C.F. Working Plans, who on scrutinizing the proposals will forward them to the Conservator of Forests of the territorial circle with his opinion and report as to the manner the departure decided upon should be recorded. The Conservator of Forests will then pass on the proposal to the Chief Conservator of Forests through the Conservator of Forests, Working Plans Circle with his remarks.

13.22.5. The Government of India has created a working plan cell in the Ministry of Environment & Forests under the Director General of Forests. This cell has to be associated while considering any deviation from the prescriptions of the approved working plans and this deviation will be allowed only after obtaining the approval of the Inspector General of Forests. All proposals for deviations must be entered in a Register of Deviation maintained by the Division office. The proforma for submission of deviation proposals are given in **Appendix No. LXXIV**.

SECTION –13.23: TRIBAL WELFARE:

13.23.1 To ensure a proper environmental and ecological balance, it is essential that the cultural survival and socio-economic well being of the tribal is well taken care off. Unless it is done all attempts aiming at protection of forests

will be futile. Thus to ensure this, it is essential that the social and economic stability of tribal through forest based industries and programs, safeguarding their genuine domestic needs of forest produce like bamboo, firewood and constructional timber, is under taken by the forest department. All activities of minor forest produce enshrined in Non-Wood Forest Produce Working Circle will be set up for the tribals through forest department. Besides, the tribals can also be encouraged for collection of other minor forest produce, which have not been covered under (NWFP) Working Circle.

SECTION –13.24: BAMBOO HARVESTING OUTSIDE BAMBOO WORKING CIRCLE:

13.24.1. The mature bamboo clumps existing outside the bamboo overlapping working circle should be harvested from time to time for nistar supply or for departmental use or for sale by auction or tender. Such bamboo clumps will be harvested as per the directions issued by the Conservator of Forests North Chandrapur Forest Circle. For that DCF Gadchiroli will prepare a scheme and get sanctioned from CF Territorial.

SECTION-13.25: FORESTRY EXTENSION:

13.25.1. In order to promote the forestry activity in the division, the forestry extension; programs should be organized by Deputy Conservator of Forests Gadchiroli and regular awareness camps at regular intervals in the division should be taken up with the active participation of local people. The benefits of forestry and forest conservation should be explained to the local people through audio-video programs, posters presentation, nature studies, forestry lectures, TV, program etc.

SECTION –13.26: CAMPING SITES:

13.26.1. No camping site for the harvesting purpose or for any other purpose should be permitted within half a kilometer radius of the existing waterholes. The exhaustive list of such waterholes will be prepared and maintained at divisional level and the copy of the same will be provided to the Conservator of Forests, Working Plan-I, Chandrapur for record.

SECTION –13.27: RAIN GAUGE AND TEMPERATURE RECORDING STATIONS:

13.27.1. Gadchiroli and Dhanora have facilities for recording rains and temperature. There is no recording station in the interior. As Gadchiroli and Dhanora are representative places of the tract dealt with, there is no need to have more such stations.

SECTION- 13.28: METEOROLOGICAL OBSERVATIONS:

13.28.1. Since there are observatories at Gadchiroli and Dhanora so there is no need of a separate observatory for the department.

SECTION-13.29: RULES FOR TRANSIT OF FOREST PRODUCE:

13.29.1 The transit of forest produce is regulated as per the Bombay Transit of Forest Produce (Vidarbha Region and Saurashtra and Katch Areas) Rules, 1960 which are published by the Agriculture and Forest Department under No IFA-1057/22947-(VI)-J, dated 23rd April, 1960.

13.29.2 The Government of Maharashtra vide Notification No. TRS/ 1083/ 91822 (ii) CR-87-F-6, dated 13th May, 1985 has amended Section 61 of Indian Forest Act, 1927 making the law more stringent. It has authorized certain ACFs in each division as authorized officers for the purpose of this Act who will be competent to confiscate the vehicle and other machineries involved in the offence related to illicit removal of timber, firewood etc.

To facilitate the issue of passes, the Government vide TRS/1089/PK-267/89/F-6 dated 14th May 1990 has stated that the decision regarding the issue of passes to an applicant should be taken within 45 days of the submission of application.

SECTION-13.30: FOREST CONSERVATION ACT, 1980 IMPLEMENTATION:

13.30.1. A record showing the area diverted for non forestry purposes under Forest Conservation Act 1980 and the area received for that purpose and compensatory afforestation taken, will be maintained by Dy. C.F. Gadchiroli with an intimation to CF WP Chandrapur-1. The area diverted for non-forestry purpose under Forest Conservation Act, 1980 is given below.

Sr.No.	Rage	Village	Comptt. No.	Survey No.	Area diverted in Ha.	Name of the Project
1	2	3	4	5	6	7
1	Chatgaon (Sanction No.72/95-FC/1008 dt. 18.4.2001)	Bamni	414	--	25.866	Bamni Medium Irrigation Project.
			--	349	0.250	
			--	393	8.669	
			--	396	0.780	
2.	Gadchiroli (Sanction No. 8-B/06/2004-FCW/262 dated 6.2.2004)	Navegaon	167-P --	255/1 256	0.188 0.712	For the development of Semanadeo National Park

Statement showing the details of area taken over for compensatory afforestation in Gadchiroli Forest Division

Sr. No.	Name of Project	Area taken over for compensatory afforestation			Year of Plantation
		Name of Village	Sur. No.	Area (ha.)	
1	Parmparik Dagad Khadan	Bamni	K.N. 413/1	56.00	1997
2	Bamni N.M.I. Tani	Gad.	C.N. / 172	25.00	2001
3	- ,, -	Gad.	C.N. / 173	25.00	2001
4	- ,, -	Wanarchuwa	C.N. / 607	21.13	2001
5	- ,, -	Dawandi	S.N. 1	11.17	2001
6	- ,, -	Kudakwahi	S.N. 105	29.99	2001
7	- ,, -	- ,, -	S.N. 57	29.97	2001
8	---	---	---	---	2002
9	---	---	---	---	2003
10	---	---	---	---	2004
11	---	---	---	---	2005

The details of area taken over for compensatory afforestation in Gadchiroli Division is given in Appendix No.LIX of volume II.

SECTION-13.31: WORKING PLAN NOTE:

13.31.1. At the end of working plan period, the Conservator of Forests (Territorial) will prepare 1st Preliminary Working Plan Report. This will be sanctioned by the State Level Committee after discussions. This will constitute the basis for the preparation of 2nd Preliminary Working Plan Report to be prepared by the Working Plan Officer at the time of next revision of the plan.

CHAPTER – XIV

CONTROL AND RECORDS

SECTION –14.1: CONTROL AND RECORDS:

14.1.1. The following records will be maintained in Gadchiroli Forest Division Office:

- i) Control Form.
- ii) Compartment History.
- iii) Plantation and Nursery Registers.
- iv) Divisional Note Book

14.1.2. CONTROL FORMS:

All control forms and records shall be maintained as per the guidelines given in chapter No IX of Working Plan Code of Maharashtra State and the Standing Order No 24, Chapter I prescribed by the office of the Principal Chief Conservator of Forests, Maharashtra State, Nagpur (then CCF, MS Pune, dt 30.11.1967). National Working Plan Code, 2004 also stipulates that Working Plan Officer will prepare a set of control forms to control all the important operations prescribed and suggested in his Working Plan. These control forms are thus, in conformity with the National Working Plan code, 2004.

14.1.3. The records of all harvesting, subsidiary cultural operations, regeneration works and soil and moisture conservation works carried out as per this working plan prescriptions, will be maintained in the control forms. The prescribed proforma of the control forms have been given in the Appendix No. LXVIII of Volume II. These are to exercise an effective control over the working of these forests under this working plan. The control forms for harvesting in each working circle have been prescribed separately whereas those for plantations and silvicultural operations are the same for all Working Circles. The set of control forms for each working circle will be kept in a separate control book, which will have separate pages for each felling series.

14.1.4. Two sets of control forms will be prepared. One set will be kept in the divisional office and the other set will be flying for the use of the Conservator of Forests Working Plan-1, Chandrapur. The flying set will be sent annually by the Deputy Conservator of Forests Gadchiroli Division to the Conservator of Forests Working Plan-1, Chandrapur not later than 1st October every year after taking the necessary annual entries. All entries showing the deviations from the prescriptions will be underlined in red. The CF Working Plan-1, Chandrapur will scrutinize the entries and will send it to the Territorial Conservator of Forests. The Conservator of Forests (T) will in turn send it to Chief Conservator of Forests, Working Plan Nagpur with his remarks not later than 1st February of the following year. The Chief Conservator of Forests, Working Plan, Nagpur in turn will forward it to the Additional Principal Chief Conservator of Forests (Production and Management) Maharashtra State, Nagpur for perusal and further orders.

SECTION – 14.2: COMPARTMENT HISTORY:

14.2.1. Compartment histories i.e. the records of various forestry activities and observations made in the past year will be maintained in form No.I to V as given in the Appendix No. LXIX of Volume II.

Form No I: Description of the Compartment.

Form No. II: Records of plantations and changes in growing stocks.

Form No III: Records of operations and out – turns

Form No IV: Records of observations.

Form No V: Records of injuries.

14.2.2. Each Compartment must have a separate file for its records. Compartment History must be maintained in the office of Gadchiroli Forest Division since they keep the record of past management practices and their effects on the growing stocks.

14.2.3. Form No.1 has been written for each compartment during the preparation of this Working Plan and typed copies in duplicate will be supplied to the Dy. C.F. Other records will be prepared immediately and maintained by him. One copy of the compartment history will be kept in the Divisional office and the other in the Range office.

14.2.4. Every year, in July, the Range Forest Officer will fill in the columns of the compartment history forms and submit the same to the Dy. C.F. The Dy. C.F. will get them scrutinized through ACF, who will get them typed and will sign. One copy of the forms will be filed in the divisional compartment history file and another copy will be returned to RFO. The copies of annual compartment history files kept in division office, after completion will be supplied yearly in the month of August to the Conservator of Forests, Working Plan-1 for filing in the compartment history files, maintained in his office. After making entries in the compartment history files, maintained in the office of the Conservator of Forests, Working Plan Division-1 the same will be returned to the Dy. C.F. Gadchiroli in the month of September.

SECTION –14. 3: PLANTATION AND NURSERY REGISTERS:

14.3.1. Plantation registers will be maintained for all the areas regenerated artificially in the Form No1 to Form No.9 as given in Appendix No. LXXI of Volume II.

Nursery registers will be maintained in Form no.1 to 10 given in Appendix No. LXXII of Volume II.

SECTION – 14.4: DIVISIONAL NOTE BOOK:

14.4.1. At divisional level all important matters will be recorded under standard headings by the Dy. C.F. every year with his explicit opinions about the success or otherwise of the application of prescriptions of the Working Plan without any reserve. A brief note about the plantation will also be recorded by the Dy. C.F. under appropriate heads. The divisional notebook will contain the information on the following topics.

- 1) Record of seed years of various tree species and bamboo.
- 2) Note on insects.
- 3) Notes on fungi.
- 4) Notes on fire damage.
- 5) Notes on other causes of injury.
- 6) Notes on building, roads and paths.
- 7) General Note on export, sale etc.
- 8) Notes on Grazing.
- 9) Statistical information on out turn and rate of important trees species.
- 10) Auction results.
- 11) Black List of contractors, sportsmen and Government servants.
- 12) Annual record of market prices of various forest produce.
- 13) List of endangered plants and animal species in the division.
- 14) List of habitual offenders / poachers in the division.
- 15) List of persons having licence for firearms and other weapons.

The form of Divisional Note book has been given in Appendix No. LXXIII of Volume II.

SECTION – 14.5: FIRE RECORDS:

14.5.1. This will be maintained as per the latest orders in force. A record of the same will also be maintained for each compartment.

SECTION -14. 6: OTHER RECORDS:

14.6.1. List of amendments to the working plan and list of area changes will be maintained in prescribed forms.

CHAPTER XV

FINANCIAL FORECAST AND COST OF THE PLAN

SECTION – 15.1: FINANCIAL FORECAST

15.1.1. FUTURE REVENUE:

National Forest Policy of 1988 lays main emphasis on the maintenance of environmental stability through preservation and restoration of ecological balance and no emphasis is laid on monetary considerations in the management of forests. The prescriptions of this working plan conform to these principles. Most of the areas in Gadchiroli Forest Division were under tremendous biotic pressure in the past & a very good amount of such areas are being covered under scientific management. Hence the main objectives of this plan are conservation and preservation of the existing forest for improvement. However, scientific management of the forest will permit removal of some silviculturally mature trees from Selection - Cum - Improvement Working Circle, Improvement Working circle & Old teak Plantation Working Circle. The major yield will be obtained from the Selection - Cum - Improvement Working Circle & Improvement Working circle. Besides this, some quantity of materials and pole-wood will be available from Teak Plantation Working Circle. Among the minor forest produces, Tendu will be the major revenue earning produce. Bamboo is excellent in this tract so very handsome revenue will be obtained from bamboo. Besides tendu and bamboo some Revenue is also obtained from Minor Forest Produces like *Hirda*, *Gum*, *Moha flower*, *Moha fruit*, *lac* etc. The table below gives a rough estimate of future annual yield.

Table No. -86

Estimated Annual Yield

S.N.	Kind of produce	Quantity	Remarks
1.0	Timber a. Teak b. Misc.	1582 cum 30070 cum	(App.5%of timber yield) (App.95%of timber yield)
Total		31652 cum	
2.0	Firewood a. Teak b. Misc.	913 beats 17346 beats	(5% of Firewood) (95% of Firewood)
Total		18259 beats	
3.0	Tendu	64600 std.bags.	----
4.0	Bamboo-a) Long Bamboo b) Bundle	8 Lakhs 1.5 Lakhs	
5.0	Misc., Hirda, Gum, Moha flower, Moha fruits, Lac etc.	2000 Qtl.	----

15.1.2. An accurate forecast of revenue is not possible as the prices of timber, firewood and other minor forest produces are not constant and stable.

However, the table gives a rough estimate of revenue, based on current rate, expected from the sale of various forest produce in Gadchiroli Forest Division.

Table No. -87
Estimated Annual Revenue

S.N.	Kind of produce	Revenue in Lakhs	Remarks
1	Timber : a. Teak b. Misc.	276.85 1578.68	@ Rs.17500/-perm3 @ Rs.5250/- per m3
2	Firewood: a.Teak b. Misc.	27.39 86.73	@ Rs.3000/- per beat @ Rs. 500/- per beat
3	Tendu	323.00	@ Rs. 500/- per Standard bag
4.	Bamboo- a) Long b) Bundle	112.00 37.50	
5.	Hirda, Gum,Moha flower, Moha fruits, Lac etc.	10.00	@ Rs.500/- per Qtl
	Total	2452.15	

15.1.3 In addition to this, the intangible benefits from the forests. Such as checking soil erosion, improving the water regime, providing employment and recreation, maintaining the ecological balance etc. are difficult to quantify in terms of money. However, the environmental loss has been calculated by the Ministry of Environment, Government of India for the purpose of the proposals under Forest Conservation Act, 1980. On this basis, the annual intangible benefits in terms of money is calculated as follows.

15.1.4 From one hectare area of fully stocked forests, we get the benefits worth Rs.126.00 Lakhs to be accrued over a period of 50 years. Hence in one year, we will get the benefit worth Rs. 2.52 Lakhs. And from these forests having average density of 0.5, we are getting the benefits worth Rs. 1.26 Lakhs per ha. annually. The wooded areas included in this plan are about 218529.27 ha. Hence the total intangible benefits being accrued from these forests are worth Rs. 275346.88 Lakhs per year.

15.1.5. FUTURE EXPENDITURE:

An approximate estimate of the total expenditure on various activities as per the prescriptions made in this plan excluding proposed establishment has been made. The details of expenditure that would be incurred in carrying out the prescriptions of this plan are given in **Table No.-93**. Calculations have been made on the basis of wage Board rates for 2004-05 for both North and South Chandrapur Circles. The rates for plantation schemes are standard sanctioned rates in the department and the same have been considered for calculations. The figures of rates for the 2005-06 were obtained by increasing 10% in previous year's rates and figures for subsequent years have been obtained by increasing previous year's figures by 10%. For bamboo harvesting only departmental expenditure has been taken and as commercial harvesting is done by BILT the expenses are borne by it. For afforestation working circle, net area available for plantation has been taken as 60% of the total area of the coupe. The expected expenditure for tendu collection has not been taken into account

because of the fact that presently collection is done by the lessees and expenditure is borne by them. But if the Govt. changes its policy, the expenditure on tendu collection will come in picture and expected expenditure will be estimated. The expected expenditure for executing activities as suggested under NTFP working circle have not been estimated. As soon as these activities start, both expenditure and revenue will sharply go up.

15.1.6 COST BENEFIT ANALYSIS:

Without accounting for the intangible benefits, we cannot complete the cost benefit analysis for managing the forests whose prime function is to maintained the ecological balance.

Thus the C/B ratio is about 0.0048 (if intangible benefits are considered) and about 1.85 (if intangible benefits are not considered) for the year 2007-2008. Expenditure and Revenue for the year 2007-2008, which were taken for C/B ratio, are Rs.1320.15 Lakhs and Rs. 2452.15 Lakhs respectively.

SECTION –15. 2 COST OF THE PLAN:

15.2.1 The total expenditure incurred on the preparation of this plan is Rs. 69,69,677/-. This comes to Rs. 44.25 per ha for total area covered under this plan.

TABLE No.88– (EXPENDITURE IN THOUSANDS)						
S.N.	Items of the Work	2007-08	2008-09	2009-10	2010-11	2011-12
1	Demarcation & marking @ 4.5 MD or Rs.418/- per ha	4555	5011	5513	6064	6670
2	Coupe Working					
	a.Timber @7.7 MD/cum or Rs.716/-per cum	22663	24929	27422	30164	33180
	b.Firewood @ 4.26 MD/beat or Rs.396/- per beat	7231	7954	8749	9624	10586
	b. Bamboo coupe demarcation 35840 ha.	1650	1815	1997	2197	2417
	d. Long Bamboo, 3/- each	2400	2640	2904	3194	3513
	e. Bamboo bundle @ 6/-	900	990	1089	1198	1318
3	Removal of wind fallen (300 cum timber & 200 beat)					
	a. Timber 7.7 per MD @ Rs.716/- cum	358	394	433	476	524
	b. Firewood 4.26 MD@ Rs.396/beat	316	348	383	421	463
4	CBO @ 6 MD per ha or Rs.558/- per ha	--	1667	1834	2017	2219
5	Cleaning @ 8 MD/ha or	--	--	--	--	--

	Rs.744/- per ha. 2987 ha.					
6.	Tendu Collection	19380	21318	23450	25795	28374
7	Afforestation : Rate in Rs. Per ha Operation Mice Bam. Arjun	Total annual plantation considering unworkable areas & Plantation area = 1094 ha				
	PPO 13200 / ha	14441	15885	17473	19220	21142
	FYO 11000 / ha	--	12034	13237	14561	16017
	SYO 9000/- ha.	--	--	9846	10831	11914
	TYO 6000/- ha.	--	--	--	6564	7220
	4 th YO 563/- ha.	--	--	--	--	616
	5 th YO 563/-ha.	--	--	--	--	--
8	Maintenance of Roads, Bridges, C.N. & Depot.	5940	6534	7187	7906	8697
9	Wages	11754	12929	14222	15644	17208
10	Office Expenses	1520	1672	1839	2023	2225
11	Petrol/Diesel	510	561	617	679	747
12	Vehicle	340	374	411	452	497
13	Material Supply	2179	2397	2637	2901	3191
14	Salary	31942	35136	38650	42515	46766
15	Traveling Allowance	2680	2948	3243	3567	3924
16	Miscellaneous	1256	1382	1520	1672	1839
Total		132015	158918	184656	209685	231267

TABLE No.-89 (EXPENDITURE IN THOUSANDS)

S.N.	Items of the Work	2012-13	2013-14	2014-15	2015-16	2016-17
1	Demarcation & marking @ 4.5 MD or Rs.418/- per ha	7337	8071	8878	9765	10742
2	Coupe Working					
	a.Timber @7.7 MD/cum or Rs.716/- per cum	36498	40148	44163	48579	53437
	b.Firewood @ 4.26 MD/beat or Rs.396/- per beat	11645	12809	14090	15499	17049
	a. Bamboo coupe demarcation 35840 ha.	2659	2925	3217	3539	3893
	d. Long bamboo @ 3/-	3864	4250	4675	5143	5657
	e. Bamboo bundle @ 6/-	1450	1595	1754	1929	2122
3	Removal of wind fallen (300 cum timber & 200 beat)					
	a. Timber 7.7 per MD @ Rs.716/- cum	576	634	697	767	844
	b. Firewood 4.26 MD@ Rs.396/beat	509	560	616	678	746
4	CBO @ 6 MD per ha	2441	2685	2953	3248	3573

	or Rs.558/- per ha 2987 ha					
5	Cleaning @ 8 MD/ha or Rs.744/- per ha. 2987 ha.	2222	2444	2688	2957	3253
6.	Tendu Collection	31211	34332	37765	41542	45696
7	Afforestation : Rate in Rs. Per ha Operation Mice Bam. Arjun	Total annual plantation considering unworkable & plantation areas = 1094 ha				
	PPO 13200 / ha	23256	25582	28140	30954	34049
	FYO 11000 / ha	17619	19381	21319	23451	25796
	SYO 9000/- ha.	13105	14416	15858	17444	19188
	TYO 6000/- ha.	7942	8736	9610	10571	11628
	4 th YO 563/- ha.	678	746	821	903	993
	5 th YO 563/-	616	678	746	821	903
8	Maintenance of Roads, Bridges, C.N. & Depot	9567	10524	11576	12734	14007
9	Wages	18929	20822	22904	25194	27713
10	Office Expenses	2448	2693	2962	3258	3584
11	Petrol/Diesel	822	904	994	1093	1202
12	Vehicle	547	602	662	728	802
13	Material Supply	3510	3861	4247	4672	5139
14	Salary	51443	56587	62246	68471	75318
15	Traveling Allowance	4316	4748	5223	5745	6320
16	Miscellaneous	2023	2225	2448	2693	2962
	Total	257233	282958	311252	342378	376616

Yield :-Timber = 31652 cum and Firewood = 18259 beats. Average rate for the year 2007 – 2008 = Rs. 93/-.

Table No.90
YEAR WISE EMPLOYMENT GENERATION DURING PLAN PERIOD

Period	Employment generation in mandays.
2007-08	9,98,322
2008-09	11,35,588
2009-10	12,25,526
2010-11	12,80,878
2011-12	13,04,665
2012-13	13,03,000
2013-14	13,02,213
2014-15	13,05,100
2015-16	13,05,106
2016-17	13,03,903
Total	124,64,301

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